

DOCUMENT 00 0105

CONSTRUCTION SERVICES PROJECT MANUAL

for

FIRE STATION 40 KITCHEN REMODEL

at

1191 Main Street Half Moon Bay, CA 94019

Coastside Fire Protection District
1191 Main Street
Half Moon Bay, CA 94019

Advertisement Date: Tuesday, June 30, 2026

Non-Mandatory Pre Bid Meeting: Wednesday, July 8, at 9:00 A.M.

Bid Opening Date: Thursday, July 23, 2026, at 2:00 P.M.

DOCUMENT 00 0115

TABLE OF CONTENTS

A. BID INFORMATION

00 0105	Title Page
00 0115	Table of Contents
00 1115	Notice Inviting Bids
00 2115	Instructions to Bidders
00 3135	Geotechnical Data and Existing Conditions

B. BID FORMS AND SUPPLEMENTS

00 4115	Bid Form
00 4315	Bond Accompanying Bid
00 4325	Bidder Registration Form
00 4330	Subcontractors List
00 4519	Non-Collusion Affidavit
00 4545	Bidder Certifications

C. CONTRACT FORMS AND SUPPLEMENTS

00 5105	Notice of Award
00 5205	Construction Services Agreement, including: Appendix A Scope of Work Appendix B General Conditions Appendix C Insurance Appendix D Construction Performance Bond Appendix E Construction Labor and Materials Payment Bond Appendix F Supplemental Conditions
00 5505	Notice to Proceed

D. Technical Specifications

E. Project Plans

END OF DOCUMENT

DOCUMENT 00 1115

NOTICE INVITING BIDS

ARTICLE 1 INVITATION TO BID

- 1.01 Notice Inviting Bids:** Owner will receive sealed bids at the **Coastside Fire Protection District Office**, located at **1191 Main Street, Half Moon Bay, California 94019** until **2:00 PM on Thursday, July 23, 2026**, for the following public work:

COASTSIDE FIRE PROTECTION DISTRICT

**Fire Station 40 Kitchen Remodel
1191 Main Street
Half Moon Bay, CA 94019**

- 1.02 Project Description:** The Project includes, but is not necessarily limited to, demolition of the existing wing wall (between kitchen and dining table), tile floor, casework, countertop, and acoustic tile ceiling. Installation of new casework, kitchen island with sink and dishwasher, acoustic ceiling tiles and drop ceiling, lighting, kitchen appliances, luxury vinyl tile flooring, plumbing and electrical, and auto shutoff and other work as shown on the Plans and described in the Specifications. Work shall be completed within **40 Working Days** from the date when Contract Time commences to run. **Engineers Estimate: \$210,000 to \$225,000.**
- 1.03 Procurement of Bidding Documents:** Bidding Documents contain the full description of the Work. Bidders may examine a complete hard-copy set of the Bidding Documents at the Coastside Fire Protection District, 1191 Main Street, Half Moon Bay, CA 94019. Bidders can download documents at <https://www.coastsidefire.org/bulletin-abba26b>
Bidder is responsible for printing any and all of Bidding Documents.
- 1.04 Instructions:** Bidders shall refer to Document 00 2115 (Instructions to Bidders) for required documents and items to be submitted in a sealed envelope for deposit into the Bid Box at **1191 Main Street, Half Moon Bay, California 94019** no later than the time and date set forth in Paragraph 1.01 above.
- 1.05 Pre-Bid Site Visit:** Owner will conduct a Pre-Bid Conference and Site Visit at **9:00 AM on Wednesday, July 8, 2026**, at **1191 Main Street, Half Moon Bay, CA 94019**. The Pre-Bid Conference and Site Visit will last approximately **30 minutes to one hour**.
- 1.06 Bid Preparation Cost:** Bidders are solely responsible for the cost of preparing their Bids.
- 1.07 Reservation of Rights:** Owner specifically reserves the right, in its sole discretion, to reject any or all Bids, to re-bid, or to waive inconsequential defects in bidding not involving time, price or quality of the work. Owner may reject any and all Bids and waive any minor irregularities in the Bids.

ARTICLE 2 LEGAL REQUIREMENTS

- 2.01 Required Contractor's License(s):** A California **Class B**, General Building Contractor License is required to bid this contract. Joint ventures must secure a joint venture license prior to award of this Contract.
- 2.02 Required Contractor and Subcontractor Registration**
- A. Owner shall accept Bids only from Bidders that (along with all Subcontractors listed in Document 00 4330, Subcontractor List) are currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5.
- B. Subject to Labor Code Sections 1771.1(c) and (d), any Bid not complying with paragraph 2.02A above shall be returned and not considered; provided that if Bidder is a joint venture (Business &

Professions Code Section 7029.1) or if federal funds are involved in the Contract (Labor Code Section 1771.1(a)), Owner may accept a non-complying Bid provided that Bidder and all listed Subcontractors are registered at the time of Contract award.

2.03 Bid Alternates:

- A. Bid alternates are identified as follows: N/A
- B. The determination of lowest bid shall be based upon:
 - 1. Base contract bid only

2.04 Substitutions: Bidders must base their bids on products and systems specified in Contract Documents or listed by name in Addenda. Except as provided below, Owner will consider substitution requests only for “or approved equal items.” Bidders wanting to use “or approved equal items” may submit request on form to be obtained from Owner no later than **7 days after issuance of Notice of Award**.

2.05 Substitution of Securities: Owner will permit the successful bidder to substitute securities for any retention monies withheld to ensure performance of the contract, in accordance with Public Contract Code Section 22300.

2.06 Prevailing Wage Laws: The successful Bidder must comply with all prevailing wage laws applicable to the Project, and related requirements contained in the Contract Documents. 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 State of California Department of Industrial Relations, may be obtained from the California Department of Industrial Relations website [<http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>] and are deemed included in the Bidding Documents. Upon request, Owner will make available copies to any interested party. Also, the successful Bidder shall post the applicable prevailing wage rates at the Site.

2.07 Prevailing Wage Monitoring: This Project is subject to prevailing wage compliance monitoring and enforcement by the Department of Industrial Relations.

END OF DOCUMENT

DOCUMENT 00 2115

INSTRUCTIONS TO BIDDERS

Bids are requested by Owner, for a general construction contract, or work described in general, as set forth in Document 00 1115 (Notice Inviting Bids), and the following additional terms.

ARTICLE 1 - PROCEDURES FOR SUBMISSION OF BIDS

1.01 Required Pre-Bid Conference and Site Visit

- A. Owner will conduct Pre-Bid Conference and Site Visit at the date, time and location indicated in Document 00 1115 (Notice Inviting Bids), to consider such matters as Bidders may request and perform a Site Visit immediately following, at the Site. Bidders must attend Pre-Bid Conference and Site Visit and sign an attendance roster as a condition to bidding.
- B. The Site Visit may be the Bidders' only opportunity to investigate conditions at the Site. Other Pre-Bid Site Visits may be scheduled at Owner's sole discretion, depending on staff availability.
- C. Owner will issue Minutes of the Pre-Bid Conference, which shall constitute the sole and exclusive record and statement of the results of the Pre-Bid Conference. The Minutes issued by Owner are not a Contract Document.

1.02 Required Pre-Bid Investigations

- A. Prior to submission of Bid, Bidder must conduct a careful examination of Bidding Documents and understand the nature, extent, and location of Work to be performed.
- B. Invasive testing will only be allowed with Owner's written approval and under such conditions as Owner may determine in its sole discretion.
- C. Bidders may examine any available existing conditions information (e.g., record documents, specifications, studies, drawings of previous work), as well as applicable environmental assessment information (if any) regarding the Project, by giving Owner reasonable advanced notice. Owner will make copies available for a fee. A Bidder must give five (5) days advanced notice if copies are desired.

1.03 Bidder Questions and Answers

- A. Bidders must direct all questions about the meaning or intent of Bidding Documents to Owner in writing. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by written Addenda mailed, faxed, or delivered to all parties recorded by Owner as having received Bidding Documents. Owner may not answer questions received less than 10 Days prior to the date for opening Bids.
- B. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect, and Bidders shall not rely on oral statements.

1.04 Addenda

- A. Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner. Addenda shall be acknowledged by number in Document 00 4115 (Bid Form) and shall be part of the Contract Documents. A complete listing of Addenda may be secured from Owner.

ARTICLE 2 - RECEIPT OF BIDS

2.01 Date and Time

- A. Sealed Bids will be received by the Owner until the date and time indicated in Document 00 1115 (Notice Inviting Bids). All Bid envelopes will be time-stamped to reflect their submittal time. Owner

shall reject all Bids received after the specified time and will return such Bids to Bidders unopened. Bidders must submit Bids in accordance with this Document 00 2115.

2.02 Sealed Envelope Submission:

- A. Owner will receive Bids in an opaque sealed 10 inch x 13 inch envelope, containing the required items described herein.
- B. Bidders should mark their Bid envelope using the name, address, identifying information, and contract number indicated in Document 00 1115 (Notice Inviting Bids).

2.03 Required Contents of Bid Envelope

- A. Document 00 4115 (Bid Form). Bidders must submit Bids on Document 00 4115 (Bid Form) in accordance with the provisions of Document 00 4115. Bidders must complete all Bid items and supply all information required by Bid documents and specifications.
- B. Document 00 4315 (Bond Accompanying Bid). Any Bidder whose Bid equals or exceeds \$5,000 must submit Document 00 4315 (Bond Accompanying Bid) accompanied by a cashier's check, certified check (certified without qualification and drawn on a solvent bank of the State of California or a National Bank doing business in the State of California), or completed form of Document 00 4315 of not less than 10% of the base Bid, payable to Owner and completed in accordance with the provisions of Document 00 4315.
- C. Document 00 4325 (Bidder Registration Form). Bidders must submit Document 00 4325 (Bidder Registration Form), completed in accordance with the provisions of Document 00 4325.
- D. Document 00 4330 (Subcontractors List). Bidders must submit Document 00 4330 (Subcontractors List) completed in accordance with the provisions of Document 00 4330. The Subcontractors List must include the names of all subcontractors 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 the total Bid amount. Any violation of this requirement may result in a Bid being deemed non-responsive and not being considered.
- E. Document 00 4519 (Non-Collusion Affidavit). Bidders must submit Document 00 4519 (Non-Collusion Affidavit) completed in accordance with the provisions of Document 00 4519.
- F. Document 00 4545 (Bidder Certifications). Bidders must submit Document 00 4545 (Bidder Certifications) completed in accordance with the provisions of Document 00 4545.
- G. In-Use Off-Road Diesel-Fueled Fleets Regulation Compliance. Each bidder must obtain and submit valid Certificate(s) of Reported Compliance for its fleet and the fleets of listed subcontractors pursuant to Cal. Code of Regs., Title 13, Div. 3, Ch. 9, Sec. 2449. If no vehicles subject to these requirements shall be used by either bidder or its listed subcontractors, bidder shall include with its bid a statement indicating that no vehicle subject to these requirements shall be used, and/or a detailed explanation of any exemptions to the regulations.

ARTICLE 3 BID OPENING AND EVALUATION

3.01 Determination of Apparent Low Bidder

- A. Owner will open each Bidders' envelopes at the time and place indicated in Document 00 1115 (Notice Inviting Bids), initially evaluate them for responsiveness, and determine an Apparent Low Bidder as specified herein and in Document 00 1115 (Notice Inviting Bids) and Document 00 4115 (Bid Form).
- B. Apparent Low Bid will be determined solely on the total amount of all Bid items based on terms contained in Document 00 1115 (Notice Inviting Bids) and Document 00 4115 (Bid Form), or as set forth in Paragraph 2.02 of Document 00 1115 (Notice Inviting Bids). All Bidders are required to submit Bids on all Bid items (including any alternates).
- C. Owner will evaluate the Apparent Low Bidder for responsiveness and for responsibility.

- D. If Apparent Low Bidder is determined to be non-responsive or non-responsible, then Owner may proceed to the next Apparent Low Bidder's Bid pursuant to any procedures determined in its reasonable discretion, and proceed for all purposes as if this Apparent Low Bidder were the original Apparent Low Bidder.

3.02 Evaluation of Bids

- A. Bids must be full, complete, clearly written and using the required forms. Bidders shall make any change in the Bid by crossing out the original entry, entering and initialing the new entry. Bidder's failure to submit all required documents strictly as required entitles Owner to reject the Bid as non-responsive. All Bidders must submit Bids containing each of the fully executed documents supplied in this Project Manual.
- B. In evaluating Bids, Owner will consider Bidders' qualifications, whether or not the Bids comply with the prescribed requirements, unit prices, and other data, as may be requested in Document 00 4113 (Bid Form) or prior to the Notice of Award.
- C. Owner may conduct reasonable investigations and reference checks of Bidder and other persons and organizations as Owner deems necessary to assist in the evaluation of any Bid and to establish Bidder's responsibility, qualifications, financial ability, and capability to perform the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time. Submission of a Bid constitutes Bidder's consent to the foregoing.
- D. Owner shall have the right to consider information provided by sources other than Bidder. Owner shall also have the right to communicate directly with Bidder's surety regarding Bidder's bonds.
- E. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between written words and figures will be resolved in favor of the words.
- F. Bids shall be deemed to include the written responses of the Bidder to any questions or requests for information of Owner made as part of Bid evaluation process after submission of Bid.

3.03 Reservation of Rights

- A. Owner reserves the right to:
 - 1. Reject any or all nonconforming, non-responsive, unbalanced, or conditional Bids; and
 - 2. To reject the Bid of any Bidder as non-responsive as a result of any error or omission in the Bid.
- B. If Owner believes that it would not be in the best interest of Project to make an award to that Bidder, whether because the Bid is not responsive, the Bidder is unqualified or of doubtful financial ability, or fails to meet any other pertinent standard or criteria established by Owner.
- C. For purposes of this paragraph, an "unbalanced Bid" is one having nominal prices for some Bid items and enhanced prices for other Bid items.
- D. Owner may retain Bid securities and Bid bonds of other than the Apparent Low Bidder for a period of 90 Days after award or full execution of the Contract, whichever first occurs.
- E. Owner may reject any or all Bids and waive any informalities or minor irregularities in the Bids. Owner also reserves the right, in its discretion, to reject any or all Bids and to re-Bid the Project.

3.04 Required Contractor and Subcontractor Registration

- A. Owner shall accept Bids only from Bidders that (along with all Subcontractors listed in Document 00 4330, Subcontractors List) are currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5.
- B. Subject to Labor Code Sections 1771.1(c) and (d), any Bid not complying with paragraph 3.04.A, above, shall be returned and not considered; provided that if Bidder is a joint venture (Business &

Professions Code Section 7029.1) or if federal funds are involved in the Contract (Labor Code Section 1771.1(a)), Owner may accept a non-complying Bid provided that Bidder and all listed Subcontractors are registered at the time of Contract award.

ARTICLE 4 MANDATORY BID PROTEST PROCEDURES

4.01 Submission of Written Bid Protest

- A. Any Bid protest in connection with the construction contract or work described in general in Document 00 1115 (Notice Inviting Bids) must be submitted in writing to the **District's Authorized Representative, located at 1191 Main Street, Half Moon Bay, CA 94019**, before 3:30 P.M. of the fifth Business Day following posting of Document 00 5050 (Notice of Intent to Award for Construction) at **1191 Main Street, Half Moon Bay, CA 94019**.
- B. The initial protest document must contain a complete statement of the basis for the protest.
- C. The protest must refer to the specific portion of the document that forms the basis for the protest.
- D. The protest must include the name, address, and telephone number of the person representing the protesting party.
- E. Only Bidders who the Owner otherwise determines are responsive and responsible are eligible to protest a Bid; protests from any other Bidder will not be considered. In order to determine whether a protesting Bidder is responsive and responsible, Owner may evaluate all information contained in any protesting Bidder's Bid, and conduct the same investigation and evaluation as Owner is entitled to take regarding an Apparent Low Bidder.
- F. The party filing the protest must concurrently transmit a copy of the initial protest document 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 who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

4.02 Exclusive Remedy

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

ARTICLE 5 AWARD AND EXECUTION OF CONTRACT

5.01 Notice of Award and Submittal of Executed Contract Documents

- A. If Contract is to be awarded, it will be awarded to the lowest responsible responsive Bidder. Owner will issue Document 00 5105 Notice of Award. Such Award, if made, will be made within ninety (90) days after the opening of the Bid Proposals.
- B. Successful Bidder must execute and submit to Owner the "Required Contract Documents and Proof of Insurance" set forth below, by 5:00 p.m. of the 20th Day following the Notice of Award.

5.02 Required Contract Documents and Proof of Insurance

- A. Document 00 5205 (Construction Services Agreement), fully executed by successful Bidder. Submit **two** originals, each bearing an original signature on the signature page and initials on each page.
- B. Insurance certificates and endorsements required by Document 00 5205 Appendix C: Submit one original set.
- C. If Contract Sum exceeds (or is expected to exceed) \$25,000, Construction Performance Bond in form provided at Document 00 5205 Appendix D, fully executed by successful Bidder and surety, in the amount set forth therein. Submit one original.

- D. If Contract Sum exceeds (or is expected to exceed) \$25,000, Construction Labor and Material Payment Bond in form provided at Document 00 5205 Appendix E, fully executed by successful Bidder and surety, in the amount set forth therein. Submit one original.
- E. Any other items identified by Owner in Document 00 5105 (Notice of Award).

5.03 Failure to Execute and Deliver Documents:

- A. If Bidder to whom Contract is awarded, within the period described in this Document 00 2115, fails or neglects to execute and deliver all required Contract Documents and file all required bonds, insurance certificates, and other documents, Owner may, in its sole discretion, rescind the award, recover on Bidder's surety bond, or deposit Bidder's cashier's check or certified check for collection, and retain the proceeds thereof as liquidated damages for Bidder's failure to enter into the Contract Documents. Bidder agrees that calculating the damages Owner may suffer as a result of Bidder's failure to execute and deliver all required Contract Documents would be extremely difficult and impractical and that the amount of Bidder's required Bid security shall be the agreed and presumed amount of Owner's damages.
- B. Upon such failure to timely deliver all required Contract Documents as set forth herein, Owner may determine the next Apparent Low Bidder and proceed accordingly. Such Award, if made, will be made within sixty (60) days after the opening of the Bid Proposals.

ARTICLE 6 GENERAL CONDITIONS AND REQUIREMENTS

6.01 Modification of Commencement of Work:

- A. Owner expressly reserves the right to modify the date for the Commencement of Work under the Contract and to independently perform and complete work related to Project. Owner accepts no responsibility to Contractor for any delays attributed to its need to complete independent work at the Site.
- B. Owner shall have the right to communicate directly with Apparent Low Bidder's proposed performance bond surety, to confirm the performance bond. Owner may elect to extend the time to receive faithful performance and labor and material payment bonds.

6.02 Conformed Project Manual:

- A. Following Award of Contract, Owner may prepare a conformed Project Manual reflecting Addenda issued during bidding, which will, failing objection, constitute the approved Project Manual.

6.03 Payment Bond:

- A. If the Project described in Document 00 1115 (Notice Inviting Bids) involves an expenditure in excess of twenty-five thousand dollars (\$25,000), the successful Bidder must file a payment bond with and approved by Owner prior to entering upon the performance of the Work, in accordance with Civil Code Section 9550, *et seq.*

6.04 Wage Rates:

- A. 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 State of California Department of Industrial Relations, and may be obtained from the California Department of Industrial Relations website [<http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>] and are deemed included in the Bidding Documents. Upon request, Owner will make available copies to any interested party. Also, Contractor shall post the applicable prevailing wage rates at the Site.

6.05 Withdrawal of Bids:

- A. Bidders may withdraw their Bids at any time prior to the Bid opening time fixed in this Document 00 2115, only by written request for the withdrawal of Bid filed with Owner **at 1191 Main Street, Half Moon Bay, CA 94019**. Bidder or its duly authorized representative shall execute request to withdraw Bid.

6.06 Ineligible Contractors and Subcontractors:

- A. Owner shall not accept a Bid from a Bidder who is ineligible to bid or work on, or be awarded, a public works project pursuant to Labor Code Section 1777.1 or 1777.7. Bidders and the Contractor who is awarded the project contract shall not utilize, or allow work by, any subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to Labor Code Section 1777.1 or 1777.7. (See Public Contract Code Section 6109.) The California Division of Labor Standards Enforcement publishes a list of debarred contractors and subcontractors on the Internet at www.dir.ca.gov/DLSE/debar.html.

6.07 Public Records Act Requests:

- A. In accordance with the Public Records Act, Owner will make available to the public all correspondence and written questions submitted during the Bid period, all Bid submissions opened in accordance with the procedures set forth herein, and all subsequent Bid evaluation information. Except as otherwise require by law, Owner will not disclose trade secrets or proprietary financial information submitted by Bidders that has been designated as confidential by Bidder.
- B. Upon a request for records regarding this Bid, Owner will notify the Bidder involved, within 10 Days from receipt of the request, when the records will be made available for inspection. If the Bidder timely identifies any "proprietary, trade secret, or confidential commercial or financial" information that Bidder determines is not subject to public disclosure, and requests that Owner refuse to comply with the records request, Bidder will, at its sole expense, take all appropriate legal action and defend Owner's refusal to produce the information in all forums; otherwise Owner will make such information available to the extent require by applicable law, without restriction.
- C. Information disclosed in the Bid and the attendant submissions are the property of Owner unless Bidder makes specific reference to data that is considered proprietary.

6.08 Substitutions:

- A. Bidders must base their Bids on products and systems specified in the Contract Documents or listed by name in Addenda. Substitutions are permitted only as provided in the Contract Documents

6.09 Definitions:

- A. All abbreviations and definitions of terms used in this Document 00 2115 are set forth in Document 00 5205 (Construction Services Agreement).

END OF DOCUMENT

DOCUMENT 00 3135

GEOTECHNICAL DATA AND EXISTING CONDITIONS

ARTICLE 1 REPORTS AND INFORMATION ON EXISTING CONDITIONS

1.01 Inspection of Reports:

- A. Owner, its consultants, and prior contractors may have collected documents providing a general description of the Site and conditions of the Work. These documents may consist of geotechnical reports for and around the Site, contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, information regarding Underground Facilities, and hazardous material surveys or information (collectively, **Existing Conditions Data**.)
- B. Bidders may inspect Geotechnical and Existing Conditions Data. These documents are listed in Section 01 1100 (Summary of Work) and are available for review at the address identified therein. Copies may be obtained for the cost of reproduction and handling upon Bidder's payment for the costs.
- C. Existing Conditions Data is for information only and does not describe labor, materials or equipment furnished by Contractor, but rather, information regarding conditions of the work. Such Existing Conditions Data is not a Contract Document.

ARTICLE 2 USE OF EXISTING CONDITIONS DATA

2.01 Above-Ground Existing Conditions:

- A. Owner makes no warranty or representation of existing aboveground conditions, as-built conditions, or other aboveground actual conditions verifiable by reasonable independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder must perform prior to bidding and Bidder must not rely on the information supplied by Owner regarding existing conditions.
- B. Bidder represents and agrees that in submitting its Bid, it is not relying on any information regarding above-ground existing conditions supplied by Owner.

2.02 Underground Facilities:

- A. Information supplied regarding existing Underground Facilities at or contiguous to the Site is based on information furnished to Owner by others (e.g., the builders of such Underground Facilities or others).
- B. Owner assumes responsibility for only the general accuracy, completeness or thoroughness of information regarding Underground Facilities that are owned by Owner. This express assumption of responsibility applies only if Bidder has conducted the independent investigation required of it herein and discrepancies were not apparent. Bidder is solely responsible for any interpretation or conclusion drawn from this information. Owner is not responsible for information regarding Underground Facilities owned by others.

2.03 Hazardous Materials Surveys:

- A. Bidders may rely on this data and information for general accuracy regarding the locations of potentially hazardous materials subject of the Work. Owner does not warrant and makes no representation regarding the completeness or thoroughness of any data or information regarding existing conditions or hazardous materials including, but not limited to, quantities, characteristics, volumes, or associated structural features. Bidder represents and agrees that in submitting a Bid it is not relying on any such data, information or deductions.
- B. Data and information regarding the locations of hazardous materials are not part of Contract Documents.

2.04 Geotechnical Data:

- A. Bidder may rely upon the general accuracy of the “technical data” contained in the geotechnical reports and drawings identified above, but only insofar as it relates to subsurface conditions, provided Bidder has conducted the independent investigation required of it and discrepancies were not apparent.
- B. 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. The term “technical data” shall not include the location of Underground Facilities.
- C. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder is solely responsible for any interpretation or conclusion drawn from any “technical data” or any other data, interpretations, opinions, or information contained in supplied geotechnical data.
- D. Except as expressly set forth in this Document 00 3135, Owner does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data.
- E. Bidder represents and agrees that in submitting its Bid, it is not relying on any geotechnical data supplied by Owner, except as specifically set forth herein.

ARTICLE 3 INVESTIGATIONS

3.01 Required Investigations:

- A. Before submitting a Bid, each Bidder shall be responsible to obtain such 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, which may affect cost, progress, performance, or furnishing of Work, or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction Bidder is to employ and the 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 the Contract Documents.
- B. Bidders shall advise Owner in writing during the Bid period of any questions, suppositions, inferences or deductions Bidders may have for Owner’s review and response.
- C. Owner has provided time in the period prior to bidding for Bidder to perform these investigations.

3.02 Access to Site for Investigations:

- A. During the Pre-Bid Site Visit(s), Owner 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, provided that invasive testing will be permitted only to the extent (and upon conditions identified in) provided in Document 00 2115 (Instructions to Bidders).

END OF DOCUMENT

DOCUMENT 00 4115

BID FORM

TO THE COASTSIDE FIRE PROTECTION DISTRICT

THIS BID IS SUBMITTED BY:

(Firm/Company Name)

Re: **Fire Station 40 Kitchen Remodel at 1191 Main Street, Half Moon Bay, CA 94019.**

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the **COASTSIDE FIRE PROTECTION DISTRICT** in the form included in the Contract Documents, Document 00 5205 (Construction Services Agreement), to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Sum and within the Contract Time indicated in this Bid and in accordance with all other terms and conditions of the Contract Documents.
2. Bidder accepts all of the terms and conditions of the Contract Documents, Document 00 1115 (Notice Inviting Bids), and Document 00 2115 (Instructions to Bidders) including, without limitation, those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for 60 Days after the day of Bid opening, unless there is a bid protest, then 90 days after the day of bid opening.
3. In submitting this Bid, Bidder represents that Bidder has examined all of the Contract Documents, performed all necessary Pre-Bid investigations, attended the mandatory Pre-Bid Meeting, received the Pre-Bid Meeting minutes (if any), and received the following Addenda:

Addendum Number	<u>ADDENDUM DATE</u>	Signature of Bidder

4. Based on the foregoing, Bidder proposes and agrees to fully perform the Work within the time stated and in strict accordance with the Contract Documents for the following sums of money listed in the following Schedule of Bid Prices:

SCHEDULE OF BID PRICES

All Bid items, including lump sums, unit prices and alternates (if any), must be filled in completely. Bid items are described in Contract Documents. Quote in figures only, unless words are specifically requested.

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
1.	Demolition	1	LS	\$	\$
2.	Concrete	1	LS	\$	\$
3.	Rough Carpentry	1	LS	\$	\$
4.	Finish Carpentry	1	LS	\$	\$
5.	Walls Interior	1	LS	\$	\$
6.	Finishes Floor	1	LS	\$	\$
7.	Finishes Ceiling	1	LS	\$	\$
8.	Finishes Walls	1	LS	\$	\$
9.	Equipment	1	LS	\$	\$
10.	Plumbing	1	LS	\$	\$
11.	Electrical	1	LS	\$	\$
TOTAL				TOTAL BID PRICE	\$

Total Bid Price:

(Indicate Bid Price in Words)

5. The undersigned acknowledges that the Apparent Low Bidder will be determined as provided in Documents 00 1115 (Notice to Bidders) and Document 00 2115 (Instruction to Bidders).
6. Subcontractors for work are listed on Document 00 4330 (Subcontractors List), submitted herewith.
7. The undersigned Bidder understands that Owner reserves the right to reject this Bid.
8. If written notice of the acceptance of this Bid, hereinafter referred to as Notice of Award, is mailed or delivered to the undersigned Bidder within the time described in Paragraph 2 of this Document 00 4115 or at any other time thereafter before it is withdrawn, the undersigned Bidder will execute and deliver the documents required by Document 00 2115 (Instructions to Bidders) within the times specified therein.
9. Notice of Award or request for additional information may be addressed to the undersigned Bidder at the address set forth below.
10. The undersigned Bidder herewith encloses cash, a cashier's check, or certified check of or on a responsible bank in the United States, or a corporate surety bond furnished by a surety authorized to do a surety business in the State of California, in form specified in Document 00 2115

(Instructions to Bidders), in the amount of ten percent (10%) of the Total Bid Price and made payable to the **COASTSIDE FIRE PROTECTION DISTRICT**.

- 11. The undersigned Bidder agrees to commence Work on the date established in, and to complete all Work within the time specified in, Document 00 5205 (Construction Services Agreement).
- 12. The undersigned Bidder agrees that, liquidated damages for failure to complete all Work in the Contract within the time specified in Document 00 5205 (Construction Services Agreement) shall be as set forth in Document 00 5205.
- 13. The names of all persons interested in the foregoing Bid as principals are:

IMPORTANT NOTICE: If Bidder or other interested person is a corporation, give the legal name of corporation, state where incorporated, and names of president and secretary thereof. If a partnership, give name of the firm and names of all individual co-partners composing the firm. If Bidder or other interested person is an individual, give first and last names in full.

NAME OF BIDDER: _____

licensed in accordance with an act for the registration of Contractors, and with license number: _____ Expiration: _____.

_____ (Place of Incorporation, if Applicable) _____ (Principal)

_____ (Principal)

_____ (Principal)

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

(Signature of Bidder)

NOTE: If Bidder is a corporation, set forth the legal name of the corporation together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If Bidder is a partnership, set forth the name of the firm together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

Business Address: _____

Contractor's Representative(s): _____
(Name/Title)

(Name/Title)

Officers Authorized to Sign Contracts

(Name/Title)

(Name/Title)

(Name/Title)

(Name/Title)

Telephone Number(s):

(Area Code) (Number)

(Area Code) (Number)

Fax Number(s):

(Area Code) (Number)

(Area Code) (Number)

Date of Bid:

END OF DOCUMENT

DOCUMENT 00 4315
BOND ACCOMPANYING BID

KNOW ALL BY THESE PRESENTS:

That the undersigned

(Name of Contractor)

as Principal and the undersigned as Surety are held and firmly bound unto Owner, **COASTSIDE FIRE PROTECTION DISTRICT**, a special district of the State of California, as obligee, in the penal sum of **(Dollar Amount In Words)** _____ Dollars (\$ _____) lawful money of the United States of America being at least ten percent (10%) of the aggregate amount of said Principal's base Bid, for the payment of which, well and truly to be made, we bind ourselves, our successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal is submitting a Bid for Owner Project **Fire Station 40 Kitchen Remodel at 1191 Main Street, Half Moon Bay, CA 94019**

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Bid submitted by the said Principal be accepted and the Agreement be awarded to said Principal and said Principal shall, within the required periods, enter into the Agreement so awarded and provide any required Construction Performance Bond, Construction Labor and Material Payment Bond, insurance certificates, and all other endorsements, forms, and documents required under Document 00 2115 (Instructions to Bidders), then this obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument this _____ day of _____, 20____.
(Month)

(Corporate Seal)

By _____
Principal

By _____
Surety

(Corporate Seal)

By _____
Attorney in Fact

END OF DOCUMENT

DOCUMENT 00 4325
BIDDER REGISTRATION FORM

INDEPENDENT CONTRACTOR REGISTRATION

Contractor's License # _____

Date: _____ Fed I.D. # _____

Full Corporate Name of Company: _____

Street Address: _____

Mailing Address: _____

Phone: _____ Fax: _____

Name of Principal Contact: _____

Type of Business: _____ Sole Proprietor _____ Partnership
 _____ Non-Profit 501(c)(3) _____ Corporation
 _____ other (please explain: _____)

INSURANCE

Workers' Compensation:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

General Liability:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

Policy Limits: \$ _____

A.M. Best Rating: _____

Automobile Liability:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

Policy Limits: \$ _____

A.M. Best Rating: _____

All-risk Course of Construction (if Required by Document 00 5205 Informal Construction Services Agreement, Appendix A):

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

Policy Limits: \$ _____

A.M. Best Rating: _____

BIDDER CERTIFIES, UNDER PENALTY OF PERJURY, THAT THE FOREGOING INFORMATION IS CURRENT AND ACCURATE AND AUTHORIZES OWNER, AND ITS AGENTS AND REPRESENTATIVES TO OBTAIN A CREDIT REPORT AND/OR VERIFY ANY OF THE ABOVE INFORMATION.

SIGNATURE

DATE

SAFETY EXPERIENCE

The following statements as to the Bidder's safety experience are submitted with the Bid, as part thereof, and the Bidder guarantees the truthfulness and accuracy of all information.

1. List Bidder's interstate Experience Modification Rate for the last three years.
[20_] _____ [20_] _____ [20_] _____
2. Use Bidder's last year's Cal/OSHA 201 log to fill in the following number of injuries and illnesses:
 - a. Number of lost workday cases _____
 - b. Number of medical treatment cases _____
 - c. Number of fatalities _____
3. Employee hours worked last year _____
4. State the name of Bidder's safety engineer/manager: _____

Attach a resume or outline of this individual's safety and health qualifications and experience.

I CERTIFY, UNDER PENALTY OF PERJURY, THAT THE FOREGOING INFORMATION IS CURRENT AND ACCURATE AND I AUTHORIZE OWNER, AND ITS AGENTS AND REPRESENTATIVES TO OBTAIN A CREDIT REPORT AND/OR VERIFY ANY OF THE ABOVE INFORMATION.

BIDDER:

By: _____
Signature

Its: _____
Title

Date _____

END OF DOCUMENT

NOTE: If Bidder [including any partner or venturer of a partnership or joint venture] is a corporation, this affidavit must be signed by the Chairman, President, or Vice President and by the Secretary, Assistant Secretary, Chief Financial Officer, or Assistant Treasurer.

NOTE: If Bidder's affidavit on this form is made outside the State of California, the official position of the person taking such affidavit shall be certified according to law.

END OF DOCUMENT

DOCUMENT 00 4545

BIDDER CERTIFICATIONS

TO BE EXECUTED BY ALL BIDDERS AND SUBMITTED WITH BID

The undersigned Bidder certifies to Owner as set forth in sections 1 through 7 below.

1. STATEMENT OF CONVICTIONS

By my signature hereunder, I hereby swear, under penalty of perjury, that no more than one final, unappealable finding of contempt of court by a Federal Court has been issued against Bidder within the past two years because of failure to comply with an order of a Federal Court or to comply with an order of the National Labor Relations Board.

2. CERTIFICATION OF WORKER'S COMPENSATION INSURANCE

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this Contract.

3. CERTIFICATION OF PREVAILING WAGE RATES AND RECORDS

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Labor Code Section 1773, which requires the payment of prevailing wage on public projects. Also, that the Contractor and any subcontractors under the Contractor shall comply with Labor Code Section 1776, regarding wage records, and with Labor Code Section 1777.5, regarding the employment and training of apprentices. It is the Contractor's responsibility to ensure compliance by any and all subcontractors performing work under this Contract.

4. CERTIFICATION OF COMPLIANCE WITH PUBLIC WORKS CHAPTER OF LABOR CODE

By my signature hereunder, as the Contractor, I certify that I am aware of Sections 1777.1 and 1777.7 of the California Labor Code and Contractor and Subcontractors and am eligible to bid and work on public works projects.

5. CERTIFICATION OF NON-DISCRIMINATION

By my signature hereunder, as the Contractor, I certify that there will be no discrimination in employment with regard to race, color, religion, gender, sexual orientation, age or national origin; that all federal, state, and local directives and executive orders regarding non-discrimination in employment will be complied with; and that the principal of equal opportunity in employment will be demonstrated positively and aggressively.

6. CERTIFICATION OF NON-DISQUALIFICATION

By my signature hereunder, as the Contractor, I swear, under penalty of perjury, that the below indicated Bidder, any officer of Bidder, or any employee of Bidder who has a proprietary interest in such Bidder, has never been disqualified, removed, or otherwise prevented from bidding on, or completing a Federal, State, or local government project because of a violation of law or safety regulation, except as indicated on the separate sheet attached hereto entitled "Previous Disqualifications." If a statement of "Previous Disqualifications" is attached, please explain the circumstances.

7. CERTIFICATION OF ADEQUACY OF CONTRACT AMOUNT

By my signature hereunder, as the Contractor, pursuant to Labor Code Section 2810(a), I certify that, if awarded the Contract based on the undersigned's Bid, the Contract will include funds sufficient to allow the Contractor to comply with all applicable local, state, and federal laws or regulations governing the labor or services to be provided. I understand that Owner will be relying on this certification if it awards the Contract to the undersigned.

BIDDER:

(Name of Bidder)

Date: _____, [20]

By: _____

(Signature)

Name: _____

(Print Name)

Its: _____

(Title)

END OF DOCUMENT

DOCUMENT 00 5105

NOTICE OF AWARD

Dated _____

TO: _____

ADDRESS: _____

CONTRACT NO.: _____

CONTRACT FOR: **COASTSIDE FIRE PROTECTION DISTRICT**
Fire Station 40 Kitchen Remodel
1191 Main Street, Half Moon Bay, CA 94019

The Contract Sum of your Agreement is _____
(Amount in Words)

Dollars (\$ _____)

1. **[Three]** copies of the proposed Contract Documents listed below accompany this Notice of Award.
2. You must comply with the following conditions precedent by **[5:00 p.m.]** of the **[20th Day]** following the date of this Notice of Award, that is, by **[Day of the Week, Month Day, 201__]**.
 - a. Deliver to Owner **[two]** fully executed counterparts of Document 00 5205 (Construction Services Agreement). Each copy of Document 00 5205 must bear your original signature on the signature page and your initials on each page.
 - b. Deliver to Owner one original set of the insurance certificates with endorsements required by Document 00 5205 Appendix C.
 - c. If your Contract Sum exceeds (or is expected to exceed) \$25,000, deliver to Owner one original Construction Performance Bond in form attached to Document 00 5205 as Appendix D, executed by you and your surety.
 - d. If your Contract Sum exceeds (or is expected to exceed) \$25,000, deliver to Owner one original Construction Labor and Material Payment Bond in form attached to Document 00 5205 as Appendix E, executed by you and your surety.
3. Failure to comply with these conditions within the time specified will entitle Owner to consider your Bid abandoned, to annul this Notice of Award, and to declare your Bid security forfeited.
4. Within **[21 Days]** after you comply with the conditions in Paragraph 2 of this Document 00 5105, Owner will return to you one fully signed counterpart of Document 00 5205 (Informal Construction Services Agreement) with **[number]** copies of the Project Manual (including Specifications and Drawings) and **[number]** sets of full-size Drawings.
5. Before you may start any Work at the Site, you must attend a pre-construction conference. The pre-construction conference may be arranged through **Sean Rose**, sean@srroseengineering.com, (650) 400-1462. Questions regarding bonds and insurance may be directed to **Kai Ruess**, kruess@adcl.com, (650) 533-2149. All other inquiries regarding the Project should be directed to **Sean Rose**, sean@srroseengineering.com, (650) 400-1462.

6. Upon commencement of the Work, you and each of your Subcontractors shall certify and provide Owner copies of payroll records in accordance with Labor Code Section 1776.

**OWNER: COASTSIDE FIRE PROTECTION
DISTRICT**

By: _____

(Signature)

(Print Name)

(Title)

ATTEST: _____

Secretary

(Print Name)

AUTHORIZED BY RESOLUTION:

NO: _____

ADOPTED: _____, [20__]

[Copy of Resolution Attached]

END OF DOCUMENT

COASTSIDE FIRE PROTECTION DISTRICT
1191 Main Street, Half Moon Bay, California 94019

CONSTRUCTION SERVICES AGREEMENT

FIRE STATION 40 KITCHEN REMODEL

Agreement No. []

DATE: _____

1. IDENTIFICATION OF CONTRACTOR:

CONTRACTOR:

LICENSE NO:

2. SCOPE OF THE WORK

See Scope of Work attached as Appendix A. (including drawings and technical specifications)

3. COMPENSATION FOR WORK. Contractor's total compensation for the Work performed under this Agreement (**Contract Sum**) is \$_____, to be paid as (**check one**): (1) lump sum; (2) lump sum with progress payments; (3) per attached schedule of rates and charges, up to a guaranteed not-to-exceed amount of \$_____. All payments (**check one**): shall shall not be subject to a five percent (5%) retention.

4. SCHEDULE OF PERFORMANCE FOR THE WORK. Contractor shall commence and complete the Work by the following dates:

Commencement Date shall be on the date established in the Notice to Proceed. Owner reserves the right to modify or alter the Commencement Date of the Work.

Substantial Completion Date: Within 35 calendar days of Commencement Date.

Final Completion Date: Within 45 calendar days from the Commencement Date.

4.01 Liquidated Damage Amounts.

- A. As liquidated damages for delay Contractor shall pay Owner Five Hundred dollars (\$500.00) for each Day that expires after the time specified herein for Contractor to achieve Substantial Completion of the entire Work, until achieved.
- B. As liquidated damages for delay Contractor shall pay Owner Five Hundred dollars (\$500.00) for each Day that expires after the time specified herein for Contractor to achieve Final Completion of the entire Work, until achieved.

4.02 Scope of Liquidated Damages

- A. Contractor and Owner agree that because of the nature of the Project, it would be impractical or extremely difficult to fix the amount of such actual damages incurred by Owner because of a delay in completion of all or any part of the Work. Contractor and Owner agree that specified measures of liquidated damages shall be presumed to be the amount of such damages actually sustained by Owner, and that because of the nature of the Project, it would be impracticable or extremely difficult to fix the actual damages.
- B. Liquidated damages for delay shall cover administrative, overhead, interest on bonds, and general loss of public use damages suffered by Owner as a result of delay. Liquidated damages shall not cover the cost of completion of the Work, damages resulting from Defective Work, lost revenues or costs of substitute facilities, or damages suffered by others who then seek to recover their damages from Owner (for example, delay claims of other contractors, subcontractors, tenants, or other third-parties), and defense costs thereof. Owner may deduct from any money due or to become due to Contractor subsequent to time for completion of entire Work and extensions of time allowed pursuant to provisions hereof, a sum representing then-accrued liquidated damages.

5. TERMS AND CONDITIONS.

5.01 Contractor shall perform the Work in accordance with the terms and conditions of this Agreement and the following attachments (together, **Contract Documents**):

- A. Appendix A – Scope of Work
- B. Appendix B – General Conditions
- C. Appendix C – Insurance
- D. Appendix D – Construction Performance Bond
- E. Appendix E – Construction Labor and Materials Payment Bond
- F. Appendix F – Supplemental Conditions, if applicable

5.02 The Contract Documents are the sole and exclusive provisions that govern the Work described herein. Any provision contained in any purchase order issued in connection with this Agreement or the Work described herein shall be null and void and shall have no force or effect.

5.03 Agreement number must appear on all invoices and correspondence. Send invoices in duplicate immediately upon performance of Work ordered hereon to:

Coastside Fire Protection District, Attention: _____, 1191 Main Street, Half Moon Bay, CA 94019

CONTRACTOR:

OWNER: **COASTSIDE FIRE PROTECTION DISTRICT**

Signature

Signature

Print Name & Title

Print Name & Title

Date

Date

Appendix A to Construction Services Agreement

SCOPE OF WORK

Fire Station 40 Kitchen Remodel per plans and specifications

Appendix B to Construction Services Agreement

GENERAL CONDITIONS

ARTICLE 1 TERMS OF PERFORMANCE

- 1.01 Construction Services Agreement (Agreement) Force and Effect.** The provisions of the Agreement and other Contract Documents constitute the entire agreement between the Contractor and Owner regarding the Work described herein. No representation, term or covenant not expressly specified in the Contract Documents shall, whether oral or written, be a part of this agreement. The Agreement and other Contract Documents shall govern the Work described herein (whenever performed), and shall supersede all other purchase orders and agreements between Contractor and Owner, and any proposal, with respect to the Work described herein.
- 1.02 No Modification or Waiver.** The Contract Documents may not be modified, nor may compliance with any of its terms be waived, except by written instrument executed and approved by fully authorized representatives of Owner and Contractor. Contract Documents headings are for convenience only and do not affect the construction of the Contract Documents.
- 1.03 Performance of Work/No Assignment.** Time is of the essence in the performance of the Work. Contractor will perform the Work in a skillful and workmanlike manner; comply fully with criteria established by Owner, and with applicable laws, codes, and all applicable industry standards. Contractor shall maintain its work area in a clean and sanitary condition, clear debris and trash at the end of each work day, and shall not damage or disrupt any property unless specifically part of the scope of the Agreement. Contractor shall not contract any portion of the Work or otherwise assign the Agreement without prior written approval of Owner. (Contractor shall remain responsible for compliance with all terms of the Contract Documents, regardless of the terms of any such assignment.) The Contractor shall permit Owner (or its designees) access to the work area, Contractor's shop, or any other facility, to permit inspection of the Work at all times during construction and/or manufacture and fabrication. The granting of any progress payment, and any inspections, reviews, approvals or oral statements by any Owner representative, or certification by any governmental entity, shall in no way limit Contractor's obligations under the Contract Documents. Either party's waiver of any breach, or the omission or failure of either party, at any time, to enforce any right reserved to it, or to require strict performance of any provision of the Contract Documents, shall not be a waiver of any other right to which any party is entitled, and shall not in any way affect, limit, modify or waive that party's right thereafter to enforce or compel strict compliance with every provision hereof. Owner shall have, at all times, set-off rights with respect to any payment and Contractor's failure to perform the terms of the Contract Documents.

ARTICLE 2 LEGAL AND MISCELLANEOUS

- 2.01 Records and Payment Requests.** Contractor shall submit all billings with all necessary invoices or other appropriate evidence of proper performance, after which Owner shall make payment within thirty (30) days. Upon Owner's written request, Contractor shall make available to Owner, its authorized agents, officers, or employees, any and all ledgers, books of accounts, invoices, vouchers, cancelled checks, and other records or documents evidencing or relating to the Work or the expenditures and disbursement charged to Owner, and all correspondence, internal memoranda, calculations, books and accounts, records documenting its Work under the Agreement, and invoices, payrolls, timecards, records and all other data related to matters covered by the Agreement. Contractor shall furnish to Owner, its authorized agents, officers, or employees, such other evidence or information as Owner may require with regard to the Work or any such expenditure or disbursement charged by Contractor. Contractor shall maintain all such documents and records prepared by or furnished to Contractor during the course of performing the Work for at least five years following completion of the Work, except that all such items pertaining to hazardous materials shall be maintained for at least thirty (30) years. Contractor shall permit Owner to audit, examine and make copies, excerpts and transcripts from such records. The State of California or any federal agency having an interest in the subject of the Agreement shall have the same rights conferred to Owner by this section. Such rights shall be specifically enforceable.

- 2.02 Independent Contractor.** Contractor is an independent Contractor and does not act as Owner's agent in any capacity, whatsoever. Contractor is not entitled to any benefits that Owner provides to Owner employees including, without limitation, insurance, worker's compensation benefits or payments, pension benefits, health benefits or insurance benefits. Terms within the Contract Documents regarding directives apply to and concern the result of the Contractor's provision of Work not the means, methods, or scheduling of the Contractor's Work. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures with respect to its provision of Work under the Contract Documents. Contractor shall pay all payroll taxes imposed by any governmental entity and will pay all other taxes not specifically identified in the Contract Documents as Owner's responsibility.
- 2.03 Indemnity/Liability.** Contractor shall defend, indemnify, and save harmless, to the fullest extent permitted by law, the Owner and each of its officers, directors, representatives, agents and employees, against all claims, suits, actions, loss, cost, damage, expense, and liability arising from or related to bodily injury to or death of any person or damage to any property, or resulting from any breach and/or Contractor's negligence in performing the Work pursuant to the Contract Documents. Notwithstanding any provision of the Contract Documents, Owner shall not be liable to Contractor or anyone claiming under it, in contract or tort, for any special, consequential, indirect or incidental damages arising out of or in connection with the Contract Documents or the Work. Owner's rights and remedies, whether under the Agreement or other applicable law, shall be cumulative and not subject to limitation. Contractor's obligations to defend, indemnify, and save harmless the Owner are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained within this Agreement. Contractor's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law.
- 2.04 Defective Work; Warranties.** Contractor warrants that all construction services shall be performed in accordance with generally accepted professional standards of good and sound construction practices, all Contract Documents requirements, and all laws, codes, standards, licenses, and permits. Contractor warrants that all materials and equipment shall be new, of suitable grade of their respective kinds for their intended uses, and free from defects. Contractor hereby grants to Owner for a period of one year following the date of completion its unconditional warranty of the quality and adequacy of all of the Work including, without limitation, all labor, materials and equipment provided by Contractor and its Subcontractors of all tiers. If either prior to completion of the Work, or within one year after completion, any Work (completed or incomplete) is found to violate any of the foregoing warranties (**Defective Work**), Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, correct, remove and replace the Defective Work with conforming Work, and correct, remove and replace any damage to other Work or other property resulting therefrom. If Contractor fails to do so, Contractor shall pay all of the Owner's resulting claims, costs, losses and damages. Where Contractor fails to correct Defective Work, or defects are discovered outside the correction period, Owner shall have all rights and remedies granted by law.
- 2.05 Compliance with Laws; Conflict of Interests.** Contractor agrees to comply with all applicable federal and state laws, regulations and policies, as amended, including those regarding discrimination, unfair labor practices, anti-kick-back, collusion, and the provisions of the Americans with Disability Act. Contractor, its officer, partners, associates, agents, and employees, shall not make, participate in making, or in anyway attempt to use the position afforded them by the Contract Documents to influence any governmental decision in which he or she knows or has reason to know that he or she has a financial interest under applicable state, federal and local conflict of interest regulations. Contractor warrants that no person or agency has been employed or retained to solicit or obtain the Agreement upon an agreement or understanding for a contingent fee, except a bona fide employee or agency.
- 2.06 Termination; Suspension; Disputes.** Owner may direct Contractor to terminate, suspend, delay, interrupt or accelerate Work, in whole or in part, for such periods of time as Owner may determine in its sole discretion. Owner will issue such directives in writing, and may do so, in whole or in part, for its convenience or due to Contractor's fault. Owner will compensate Contractor for extra costs

resulting from such directives only to the extent that Owner issues such directives for its convenience and not due to Contractor's fault (but Owner shall not compensate Contractor for costs, profit or overhead anticipated to be earned or incurred on Work terminated for Owner's convenience.) Contractor shall continue its Work throughout the course of any dispute, and Contractor's failure to continue Work during a dispute shall be a material breach of the Contract Documents. Except as otherwise specified, all claims by Contractor against Owner shall be submitted in writing to Owner, and shall be governed by Public Contract Code Sections 20104 – 20104.6, after which time the one year time period in Government Code Section 911.2 shall be, pursuant to Government Code Section 930.2, reduced to 90 days. Should Contractor be terminated for default, and such termination is subsequently determined to be wrongful, such termination will be converted to a termination for convenience as provided herein.

- 2.07 Execution; Venue; Limitations.** The Agreement shall be deemed to have been executed in San Mateo County, California. Enforcement of the Contract Documents shall be governed by the laws of the State of California, excluding its conflict of laws rules. Except as expressly provided in the Contract Documents, nothing in the Contract Documents shall operate to confer rights or benefits on persons or entities not party to the Agreement. As between the parties to the Agreement, any applicable statute of limitations for any act or failure to act shall commence to run on the date of Owner's issuance of the final Certificate for Payment, or termination of the Contract Documents, whichever is earlier, except for latent defects, for which the statute of limitation shall begin running upon discovery of the defect and its cause.
- 2.08 Employee Wages; Records; Apprentices.** Contractor shall pay prevailing wages to its employees on any contract in excess of \$1,000.00 (one thousand dollars). Copies of the prevailing rate of per diem wages are on file at Owner's principal office. Contractor shall comply with the 8-hours per day/40 hours per week/overtime/working hours restrictions for all employees, pursuant to the California Labor Code. Contractor and all subcontractors shall keep and maintain accurate employee payroll records for Work performed under the Agreement. The payroll records shall be certified and submitted as required by law, including Labor Code Section 1771.4 (if applicable) and 1776, including (if the Agreement is awarded on or after April 1, 2015 or continues on or after January 1, 2016) to the Labor Commissioner no less frequently than monthly. Contractor shall comply fully with Labor Code Section 1777.5 in the hiring of apprentices for work relating to the Agreement. If the Agreement exceeds \$2,000 and is funded with federal funds, then Contractor shall pay federal Davis Bacon wages and comply with applicable federal requirements.
- 2.09 Mandatory Contractor and Subcontractor Registration.** Pursuant to Labor Code Section 1771(a), Contractor represents that it and all of its Subcontractors are currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5. Contractor covenants that any additional or substitute Subcontractors will be similarly registered and qualified.
- 2.10 Worker's Compensation.** Pursuant to Labor Code Sections 1860 and 1861, in accordance with the provisions of Section 3700 of the Labor Code, every contractor will be required to secure the payment of compensation to his employees. Contractor represents that it is aware of the provisions of Labor Code Section 3700 that 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 Contractor shall comply with such provisions before commencing the performance of the Work.
- 2.11 Construction Performance Bond; Construction Labor and Materials Payment Bond; Securities in Lieu of Retention Escrow Account.**
- A. If Contract Sum under the Agreement exceeds (or is expected to exceed) \$25,000, Contractor shall provide a construction performance bond in form attached hereto as Appendix D – Construction Performance Bond, and a construction labor and material payment bond, in accordance with Civil Code Section 9550 and in form attached hereto Appendix E – Construction Labor and Materials Payment Bond. Contractor may not substitute cash in lieu of the required bond(s).
 - B. If the Agreement specifies performance retention, Contractor may elect to substitute securities or direct payment to an escrow account, pursuant to Public Contract Code Section 22300 (incorporated herein by this reference).

2.12 Earthwork and Underground Facilities. If the Work involves digging trenches or other excavations that extend deeper than four feet below the surface, Contractor shall notify Owner in writing of any material that Contractor believes may be hazardous waste that is required to be removed in accordance law, subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to bidders prior to the deadline for submitting bids, or 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 Documents, pursuant to Section 7104 of the Public Contract Code. For any Work involving trench shoring that costs in excess of \$25,000, Contractor shall submit and Owner (or a registered civil or structural engineer employed by Owner) must accept, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches, pursuant to Labor Code Section 6705. If such plan varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer. Consistent with Government Code Section 4215, as between Owner and Contractor, Owner will be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the Site only if such utilities are not identified in the Contract Documents or information made available for bidding.

2.13 Resolution of Construction Claims. Any public works claims arising under this contract which the Contractor wishes to assert against the Governing Agency shall be governed by California Public Contract Code Section 9204. Claims which do not exceed three hundred seventy-five thousand dollars (**\$375,000**) are also subject to the provisions of Article 1.5 of the California Public Contract Code (commencing with Section 20104). Pursuant to California Public Contracts Code Section 9204, claims shall be resolved as follows:

(d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant 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 public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) 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 public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is

undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant 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.

(C) 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.

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity'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 the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity 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 the 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 public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) 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; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

Appendix C to Construction Services Agreement

1. Commercial General Liability Insurance, written on an “occurrence” basis, which shall provide coverage for bodily injury, death and property damage resulting from operations, liability for slander, false arrest and invasion of privacy, blanket contractual liability, broad form endorsement, and completed operations, personal and advertising liability, with limits of not less than **[\$2,000,000]** general aggregate and **[\$1,000,000]** each occurrence, subject to a deductible of not more than **[\$1,000]** payable by Contractor.
2. Business Automobile Liability Insurance with limits not less than **[\$1,000,000]** each occurrence including coverage for owned, non-owned and hired vehicles, subject to a deductible of not more than **[\$1,000]** payable by Contractor.
3. Workers’ Compensation Employers’ Liability limits not less than **[\$1,000,000]** each accident, **[\$1,000,000]** per disease and **[\$1,000,000]** aggregate. Contractor’s Workers’ Compensation Insurance policy shall contain a Waiver of Subrogation against the Coastsides Fire Protection District, its officers, directors, officials, agents, employees and volunteers. In the event Contractor is self-insured, it shall furnish Certificate of Permission to Self-Insure signed by Department of Industrial Relations Administration of Self-Insurance, State of California.
4. Builder’s Risk Insurance including, without limitation, coverage against loss or damage to the Work by fire, lightning, wind, hail, aircraft, riot, vehicle damage, explosion, smoke, falling objects, vandalism, malicious mischief, collapse, and other such hazards as are normally covered by such coverage. Such insurance shall be in amount equal to the replacement cost (without deduction for depreciation and subject to stipulated value in lieu of average clause) of all construction constituting any part of the Work, excluding the cost of excavations, of grading and filling of the land, and except that such insurance may be subject to deductible clauses not to exceed **[\$10,000]** for any one loss. Such insurance will not cover loss or damage to Contractor’s equipment, scaffolding or other materials not to be consumed in the construction of the Work. The insurer shall waive all rights of subrogation against Owner.
5. Any available insurance proceeds broader than or in excess of the specified minimum insurance coverage requirements and/or limits shall be available to the Owner as an additional insured. The requirements for coverage and limits shall be the greater of either the minimum coverage and limits specified in this Agreement or the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the named insured.
6. Insurance policies in Appendix C shall contain an endorsement containing the following terms:
 - 6.01 Coastsides Fire Protection District, its officers, directors, officials, agents, employees, and volunteers, shall be named as additional insureds, but only with respect to liability arising out of the activities of the named insured, and there shall be a waiver of subrogation as to each named and additional insured.
 - 6.02 The policies shall apply separately to each insured against whom claim is made or suit is brought except with respect to the limits of the company’s liability.
 - 6.03 Written notice of cancellation, non-renewal or of any material change in the policies shall be mailed to Owner thirty (30) days in advance of the effective date thereof.
 - 6.04 Insurance shall be primary insurance and no other insurance or self-insured retention carried or held by any named or additional insureds other than Contractor shall be called upon to contribute to a loss covered by insurance for the named insured.
7. Certificates of Insurance and Endorsements shall have clearly typed thereon the Project Name, shall clearly describe the coverage and shall contain a provision requiring the mailing of written notices of cancellation described in clause 5.03 above.
8. All policies of insurance shall be placed with insurers acceptable to Owner. The insurance underwriter(s) must be duly licensed to do business in the State of California and (other than for workers’ compensation) must have an A. M. Best Company rating of **[A-,VII]** or better. Required

minimum amounts of insurance may be increased should conditions of Work, in the opinion of Owner, warrant such increase. Contractor shall increase required insurance amounts upon direction by Owner.

9. The insurance coverage limits may be satisfied by a combination of primary and umbrella or excess insurance. Any umbrella or excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the benefit of Owner, to the extent required by this Agreement, before the Owner's insurance or self-insurance may be called upon to protect Owner as a named insured.
10. All self-insured retentions (SIR) must be disclosed to Owner for approval and shall not reduce the limits of liability coverage. Policies containing and SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named Contractor/named insured or Owner.
11. Contractor agrees to include with all subcontractors in their subcontracts the same requirements and provisions of this Agreement that is required of Contractor including, without limitation, the indemnity and insurance requirements to the extent they apply to the scope of the subcontractor's work. Subcontractors hired by Contractor shall agree to be bound to Contractor and Owner in the same manner and to the same extent as Contractor is bound to Owner under this Contract and its accompanying documents. Subcontractors shall further agree to include these same provisions with any lower tier subcontractors. A copy of the indemnity and insurance provisions of this Agreement will be furnished to the Subcontractor upon request. Contractor shall require all subcontractors to provide a valid Certificate of Insurance and the required endorsements included in the subcontract agreement, and will provide proof of compliance to the Owner prior to commencement of any work by the subcontractor.
12. Contractor shall maintain insurance as required by this Agreement to the fullest amount allowed by law and shall maintain insurance for a minimum of five (5) years following completion of this project or service. In the event Contractor fails to obtain or maintain completed operations coverage as required by this Agreement, Owner at its sole discretion may purchase the coverage required and the cost will be paid by Contractor.

Appendix D to Construction Services Agreement

CONSTRUCTION PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1. THAT WHEREAS, **Coastside Fire Protection District**, a special district of the State of California (**Owner**) has awarded to **(Name of Contractor)** _____ as Principal a Construction Services Agreement dated the _____ day of _____, 20____ (**Agreement**), titled **Fire Station 40 Kitchen Remodel PROJECT** in the amount of \$_____, which Agreement is by this reference made a part hereof, for the work described as follows:

(Describe Agreement Work): Fire Station 40 Kitchen Remodel per the plans and specifications.

2. AND WHEREAS, Principal is required to furnish a bond in connection with the Agreement, guaranteeing the faithful performance thereof;
3. NOW, THEREFORE, we, the undersigned Principal and _____ as Surety are held and firmly bound unto Owner in the sum of 100% OF THE CONTRACT SUM to be paid to Owner or its successors and assigns; for which payment, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.
4. THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its heirs, executors, administrators, successors, or assigns approved by Owner, shall promptly and faithfully perform the covenants, conditions, and agreements of the Agreement during the original term and any extensions thereof as may be granted by Owner, with or without notice to Surety, and during the period of any guarantees or warranties required under the Agreement, and shall also promptly and faithfully perform all the covenants, conditions, and agreements of any alteration of the Agreement made as therein provided, notice of which alterations to Surety being hereby waived, on Principal's part to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify, defend, protect, and hold harmless Owner as stipulated in the Agreement, then this obligation shall become and be null and void; otherwise it shall be and remain in full force and effect.
5. No extension of time, change, alteration, modification, or addition to the Agreement, or of the work required thereunder, shall release or exonerate Surety on this bond or in any way affect the obligation of this bond; and Surety does hereby waive notice of any such extension of time, change, alteration, modification, or addition.
6. Whenever Principal shall be and declared by Owner in default under the Agreement, Surety shall promptly remedy the default, or shall promptly:
 - 6.01 Undertake through its agents or independent contractors, reasonably acceptable to Owner, to complete the Agreement in accordance with its terms and conditions and to pay and perform all obligations of Principal under the Agreement including, without limitation, all obligations with respect to warranties, guarantees, indemnities, and the payment of liquidated damages; or
 - 6.02 Obtain a bid or bids for completing the Agreement in accordance with its terms and conditions, and, upon determination by Owner of the lowest responsible bidder, reasonably acceptable to Owner, arrange for a contract between such bidder and Owner and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract Sum, and to pay and perform all obligations of Principal under the Agreement including, without limitation, all obligations with respect to warranties, guarantees, and the payment of liquidated damages; but, in any event, Surety's total obligations hereunder shall not exceed the amount set forth in the third paragraph hereof. The term "balance of the Contract Sum," as used in this paragraph, shall mean the total amount

payable by Owner to the Principal under the Agreement and any amendments thereto, less the amount Owner paid to Principal.

7. Surety's obligations hereunder are independent of the obligations of any other surety for the performance of the Agreement, and suit may be brought against Surety and such other sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing Owner's rights against the others. Surety may not use Contractor to complete the Agreement absent Owner's written consent.
8. No right of action shall accrue on this bond to or for the use of any person or corporation other than Owner or its successors or assigns.
9. Surety may join in any proceedings brought under the Agreement and shall be bound by any judgment.
10. Correspondence or claims relating to this bond shall be sent to Surety at the address set forth below.

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

CONTRACTOR AS PRINCIPAL

SURETY

Company: _____ (Corp. Seal)

Company: _____ (Corp. Seal)

Signature

Signature

Name

Name

Title

Title

Street Address

Street Address

City, State, Zip Code

City, State, Zip Code

Appendix E to Construction Services Agreement

CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1. THAT WHEREAS, the **Coastside Fire Protection District**, a special district of the State of California (**Owner**) has awarded to **(Name of Contractor)** _____ as Principal a Construction Services Agreement, dated the _____ day of _____, 20 ____ (**Agreement**), titled **Fire Station 40 Kitchen Remodel PROJECT** located at _____ in the amount of \$ _____, which Agreement is by this reference made a part hereof, for the work described as follows:

Fire Station 40 Kitchen Remodel per the plans and specifications.

2. AND WHEREAS, Principal is required to furnish a bond in connection with the Agreement to secure the payment of claims of laborers, mechanics, material suppliers, and other persons as provided by law;
3. NOW, THEREFORE, we, the undersigned Principal and _____ as Surety, are held and firmly bound unto Owner in the sum of 100% OF THE CONTRACT SUM (\$ _____), for which payment well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.
4. THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its heirs, executors, administrators, successors, or assigns approved by Owner, or its subcontractors shall fail to pay any of the persons named in California Civil Code Section 9100, or amounts due under the State of California Unemployment Insurance Code with respect to work or labor performed under the Agreement, or for any amounts required to be deducted, withheld, and paid over to the State of California Employment Development Department from the wages of employees of Principal and subcontractors pursuant to California Unemployment Insurance Code Section 13020 with respect to such work and labor, that Surety will pay for the same in an amount not exceeding the sum specified in this bond, plus reasonable attorneys' fees, otherwise the above obligation shall become and be null and void.
5. This bond shall inure to the benefit of any of the persons named in California Civil Code Section 9100, as to give a right of action to such persons or their assigns in any suit brought upon this bond. The intent of this bond is to comply with the California Mechanic's Lien Law.
6. Surety, for value received, hereby expressly agrees that no extension of time, change, modification, alteration, or addition to the undertakings, covenants, terms, conditions, and agreements of the Agreement, or to the work to be performed thereunder, shall in any way affect the obligation of this bond; and it does hereby waive notice of any such extension of time, change, modification, alteration, or addition to the undertakings, covenants, terms, conditions, and agreements of the Agreement, or to the work to be performed thereunder.
7. Surety's obligations hereunder are independent of the obligations of any other surety for the payment of claims of laborers, mechanics, material suppliers, and other persons in connection with the Agreement; and suit may be brought against Surety and such other sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing Owner's rights against the other.
8. Correspondence or claims relating to this bond shall be sent to Surety at the address set forth below.

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

CONTRACTOR AS PRINCIPAL

SURETY

Company: (Corp. Seal)

Company: (Corp. Seal)

Signature

Signature

Name

Name

Title

Title

Street Address

Street Address

City, State, Zip Code

City, State, Zip Code

END OF DOCUMENT

DOCUMENT 00 5505

NOTICE TO PROCEED

Dated: _____, 201__

To: _____
(Contractor)

Address: _____

AGREEMENT FOR: **Coastside Fire Protection District- FIRE STATION 40 KITCHEN REMODEL at
1191 Main Street, Half Moon Bay, CA 94019**

You are notified that the Contract Time under the above Agreement will commence to run on _____ [20__]. On that date, you are to start performing your obligations with respect to Work at the Site under the Agreement. In accordance with Document 00 5205 (Construction Services Agreement), the dates of Substantial Completion and Final Completion for the entire Work are _____, [20__] and _____, [20__], respectively.

Before you may start any Work at the Site, you must:

1. Submit certified Safety Program and related information
2. Submit copies of applicable permits
3. [Other]

OWNER: COASTSIDE FIRE PROTECTION DISTRICT

By: _____

Its: _____

END OF DOCUMENT



Project Manual

For

Coastside Fire Station No. 40 Kitchen Remodel

1191 Main Street, Half Moon Bay, CA 94019

VOLUME 1 and 2

Bidding and Contract Requirements
And
Specifications

for the

Coastside Fire Protection District
1191 Main Street, Half Moon Bay CA 94019

Date: April 2026

PBK Project No.: 250537

Package

Project Manual

for:

Coastside Fire Station No. 40 Kitchen Remodel

for the
Coastside Fire Protection District

Date: April 2026

PBK Project No.: 250537

Package

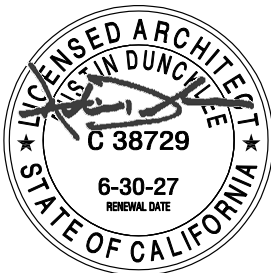
Consultants:

Architect:

PBK
408 Higuera Street
Suite 100
San Luis Obispo, CA 93401
Phone: (805) 329-3076

Electrical/Plumbing:

LEAF Engineers
408 Higuera Street
Suite 100
San Luis Obispo, CA 93401
Phone: (805) 329-3076



Project Manual Cover Sheet and Seal Page.

DOCUMENT 00 01 10 TABLE OF CONTENTS

VOLUME 1 DISTRICT DOCUMENTS

DIVISION 00 BIDDING AND CONTRACT REQUIREMENTS (Provided by District)

00 00 00	Project Manual Cover and Seals
00 00 70	PBK Interior Punch List Form
00 01 10	Table of Contents

DIVISION 1 GENERAL REQUIREMENTS

01 10 00	Summary
01 25 13	Product Substitution Procedures
01 26 13	Request for Information
01 29 00	Payment Procedures
01 29 73	Schedule of Values (Sample)
01 31 00	Project Management and Coordination
01 33 00	Submittal Procedures
01 40 00	Quality Requirements
01 60 00	Product Requirements
01 73 00	Execution
01 73 29	Cutting and Patching
01 74 19	Construction Waste Management and Disposal
01 77 00	Closeout Procedures
01 77 00.01	Closeout Forms A
01 78 23	Operation and Maintenance Data
01 78 39	Project Record Documents

PROJECT SPECIFICATIONS - Volume 2

DIVISION 2 EXISTING CONDITIONS

02 41 00	Demolition
02 41 19	Selective Demolition

DIVISION 3 CONCRETE

03 30 00	Cast-in-Place Concrete
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DIVISION 4 MASONRY Not Used

DIVISION 5 METALS Not Used

DIVISION 6 WOOD, PLASTICS, AND COMPOSITES

06 10 00	Rough Carpentry
06 20 00	Finish Carpentry and Millwork

DIVISION 7 THERMAL AND MOISTURE PROTECTION

07 92 00	Joint Sealants
----------	----------------

DIVISION 8 OPENINGS Not Used

DIVISION 9 FINISHES

09 21 16	Gypsum Board Assemblies
09 30 00	Tiling
09 51 00	Acoustical Ceiling Panels
09 65 13.13	Resilient Base
09 65 23	Luxury Vinyl Tile Flooring
09 90 00	Painting and Coating

DIVISION 10 SPECIALTIES Not Used

DIVISION 11 EQUIPMENT Not Used

DIVISION 12 FURNISHINGS Not Used

DIVISION 13 SPECIAL CONSTRUCTION Not Used

DIVISION 14 CONVEYING EQUIPMENT Not Used

DIVISION 21 FIRE SUPPRESSION Not Used

DIVISION 22 PLUMBING

22 00 00	General Plumbing Provisions
22 00 01	Plumbing

DIVISION 23 MECHANICAL Not Used

DIVISION 25 INTEGRATED AUTOMATION Not Used

DIVISION 26 ELECTRICAL

26 05 00	Common Work Results for Electrical
26 05 01	Selective Electrical Demolition
26 05 19	Low-Voltage Electrical Power Conductors and Cables
26 05 26	Grounding and Bonding for Electrical Systems
26 05 29	Hangers and Supports for Electrical Systems
26 05 33	Raceway and Boxes for Electrical Systems
26 05 53	Identification of Electrical Systems
26 09 43.13	Digital-Network Lighting Controls
26 27 26	Wiring Devices
26 51 00	Interior Lighting

DIVISION 27 COMMUNICATIONS Not Used

DIVISION 28 ELECTRONIC SAFETY AND SECURITY Not Used

DIVISION 31 EARTHWORK Not Used

DIVISION 32 EXTERIOR IMPROVEMENTS Not Used

DIVISION 33 UTILITIES Not Used

END OF SECTION 00 01 10

This is the Interior Punch List. All items on this Punch List should be corrected by _____ (date).

INTERIOR PUNCH LIST FORM

NOTE TO ARCHITECT: Circle Number next to Item to be corrected.

NOTE TO PERSON CORRECTING WORK: Initial blank next to circled number after work is corrected.

DATE: _____

ROOM NO.: _____

BUILDING: _____

JOB NAME: _____

DOORS/RAMPS/HARDWARE

- _____ 1. Adjust Closer
- _____ 2. Adjust Strike Plate
- _____ 3. Repair Damaged Plastic Laminate
- _____ 4. Install Silencers
- _____ 5. Repair Dent In Hollow Metal Frame
- _____ 6. Sand Corner Welds
- _____ 7. Door/Frame Not Labeled
- _____ 8. _____
- _____ 9. _____

PAINT & VINYL WALL COVERING

- _____ 1. Repair VWC @ N E S W Wall
- _____ 2. Repair VWC @ N E S W Wall
- _____ 3. Touch-up Paint @ N E S W Wall
- _____ 4. Touch-up Door Frame
- _____ 5. Caulk Door Frame
- _____ 6. Clean & Paint Door Jamb Return @ L/R Side
- _____ 7. Clean Glue from Wall Mold
- _____ 8. _____
- _____ 9. _____

WINDOWS

- _____ 1. Adjusted Blinds
- _____ 2. Caulk
- _____ 3. Not Closing Properly, Correct
- _____ 4. Clean VWC Blue Off Window Frame
- _____ 5. _____

TOILET ACCESSORIES

- _____ 1. Install
- _____ 2. _____
- _____ 3. _____
- _____ 4. _____

DRYWALL

- _____ 1. Repair Nick On N E S W Wall
- _____ 2. Clean D.W. Mud Off Door Frame
- _____ 3. Refinish @ _____
- _____ 4. Screw Popping Out @ _____
- _____ 5. _____
- _____ 6. _____

CASEWORK AND MILLWORK

- _____ 1. Adjust Door @ _____
- _____ 2. Adjust Drawer @ _____
- _____ 3. Caulk _____
- _____ 4. Install Shelves @ Base/Wall Cabinet
- _____ 5. Install Finisher Washer On Screws
- _____ 6. Repair Damaged Laminate @ _____
- _____ 7. Seam Fill & Repair Seam In Countertops
- _____ 8. _____

CERAMIC & QUARRY TILE

- _____ 1. Repair Damaged Tile @ _____
- _____ 2. Caulk Windowsill
- _____ 3. _____
- _____ 4. _____
- _____ 5. _____

MECHANICAL

- _____ 1. _____
- _____ 2. _____
- _____ 3. _____
- _____ 4. _____

ACOUSTICAL CEILINGS

- _____ 1. Repair Damaged Tile @ _____
- _____ 2. Adjust Tile @ Sprinkler Head
- _____ 3. Adjust Tile @ Diffuser
- _____ 4. Install Missing Tile
- _____ 5. Repair Damaged Grid @ _____
- _____ 6. Rework Inside Corner
- _____ 7. Rework Outside Corner
- _____ 8. _____

PLUMBING

- _____ 1. Tighten Drain Escutcheon
- _____ 2. _____
- _____ 3. _____
- _____ 4. _____

ELECTRICAL

- ____ 1. Clean Light Lens
- ____ 2. Level Cover Plate @ N E S W Wall
- ____ 3. _____
- ____ 4. _____

CARPET/FLOORING/BASE

- ____ 1. Clean Base Glue Off N E S W Wall
- ____ 2. Straighten Base @ _____
- ____ 3. Repair Loose Base @ _____
- ____ 4. _____

MISCELLANEOUS

'END OF SECTION 00 00 70

SECTION 01 10 00 SUMMARY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements including but not limited to:
 1. Project information.
 2. Work covered by Contract Documents.
 3. Phased construction.
 4. Work by Owner.
 5. Work under separate contracts.
 6. Future Work.
 7. Purchase contracts.
 8. Owner furnished products.
 9. Owner furnished, Contractor installed products.
 10. Access to site.
 11. Coordination with occupants.
 12. Work restrictions.
 13. Specification and Drawing conventions.
 14. Miscellaneous provisions.

1.3 PROJECT INFORMATION

- A. Project Identification:
 1. Project Location: **Coastside Fire Station No. 40**
1191 Main Street
Half Moon Bay, CA 94019
- B. Owner: **Coastside Fire Protection District**
 1. Owner's Representative: **Sean Rose, Project Manager**
- C. Architect: **PBK Architects**
408 Higuera Street
Suite 100
San Luis Obispo, CA 93401
- D. Consultants: Additional design professionals have been retained who have prepared designated portions of the Contract Documents. Refer to "stamp" page this project manual.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
Remodel of existing kitchen in Fire Station 40 as shown on the construction documents. Scope of work includes new cabinetry, countertops, appliances, flooring, ceiling, painting, and associated plumbing and electrical work.
- B. Type of Contract: Project will be constructed under a hard bid.

1.5 WORK SEQUENCE

- A. The Work shall be completed according to the Project schedule set forth below.
- B. Occupancy: The Project may be occupied by District staff as shown below. If so, the premises will be occupied whether or not the Work is completed, regardless of time extensions (if any).
- C. Any Work performed after this date will need to be fully coordinated with District.

1.6 WORK BY OWNER AND UNDER SEPARATE CONTRACTS

- A. The Owner reserves the right to let separate contract for work outside of the scope of this Contract. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Owner Furnished Products (OFCl):
 - 1. The Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner furnished products and making building services connections when applicable:
 - a. Owner Furnished Products: Coordinate with Owner.

1.7 ACCESS TO SITE

- A. Use of Site:
 - 1. Limit use of Project site to Work in areas and areas within the Contract limits indicated. Do not disturb portions of site beyond areas in which the Work is indicated:
 - a. Limits: The Drawings indicate the limits of the construction operations.
 - b. Driveways, Walkways, and Entrances:
 - 1) Keep driveways, parking areas, student drop off and pick up points, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, the students, and emergency vehicles at all times. Do not use these areas for parking or storage of materials:
 - a) Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b) Schedule deliveries to minimize space and time requirements for storage of materials and equipment onsite.
- B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in weathertight condition throughout construction period. Repair damage caused by construction operations.
- C. COVID-19 Conditions: Contractors must conform, and ensure that all subcontractors and other Project personnel, including but not limited to; workers and site visitors, conform to all regulations, limitations, and requirements as put forth and recommended by Associated General Contractors of California (AGC), State of California Guidance on Outbreak of 2019 Novel Coronavirus (2019-nCoV) in Wuhan, China, and local Health Department agencies.

1.8 COORDINATION WITH OCCUPANTS

- A. Owner Limited Occupancy of Completed Areas of Construction:
 - 1. Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided occupancy

does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work:

- a. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
- b. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
- c. Before limited Owner occupancy, ensure mechanical and electrical systems are fully operational, and required tests and inspections and start up procedures are successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
- d. Upon occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.9 WORK RESTRICTIONS

- A. Work Restrictions: Comply with restrictions on construction operations. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On Site Work Hours: Limit Work in the existing building to normal working hours, Monday through Friday, unless otherwise indicated. Coordinate with Owner when it is necessary to extend working hours or Work on weekends.
- C. Existing Utility Interruptions:
 1. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and after providing temporary utility services according to requirements indicated:
 - a. Notify Owner not less than two (2) weeks in advance of proposed utility interruptions.
 - b. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors:
 1. Coordinate operations that result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner:
 - a. Notify Owner not less than two (2) weeks in advance of proposed disruptive operations.
 - b. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Controlled Substances, Firearms, and Explosive Devices: Use of tobacco products, controlled substances, firearms, and explosive devices on the site is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on site. Require personnel to use identification tags at all times.
- G. Employee Screening:
 1. Comply with Owner's requirements for drug and background screening of Contractor personnel working on site:
 - a. Maintain list of approved screened personnel with Owner's representative.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content:
 1. The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations.

These conventions are as follows:

- a. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - b. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Drawing Coordination:
1. Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - a. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - b. Abbreviations: Materials and products are identified by abbreviations.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 CONSTRUCTION SCHEDULE

- A. The Owner has a critical need for the Work to begin upon Notice to Proceed and shall be Substantially Complete by the date specified on the Project Schedule. **There will be No Extensions of Time due to weather.**

END OF SECTION 01 10 00

SECTION 01 25 13 PRODUCT SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Specified product compliance, and product quality assurance.
 - 2. Specific administrative and procedural requirements for handling requests for substitutions made prior to award of Contract.
 - 3. Requirements for product delivery, storage, and handling.
- B. Related Requirements:
 - 1. Instructions to Offerors:
 - a. Product options and procedures for submittal of requests for substitutions during the Proposal period.

1.3 DEFINITIONS

- A. Definitions used in this Section are not intended to negate the meaning of other terms used in the Contract Documents, including such terms as “specialties,” “systems,” “structure,” “finishes,” “accessories,” “furnishings,” “special construction,” and similar terms. Such terms are self-explanatory and have recognized meanings in the construction industry:
 - 1. Equipment: Product with operational parts, regardless of whether motorized or manually operated, and in particular, a product that requires service connections such as wiring or piping.
 - 2. Materials: Products that must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, or installed to form units of work.
 - 3. Products:
 - a. Items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the Project or taken from Contractor’s previously purchased stock. The term “product” as used herein includes the terms “material”, “equipment”, “system”, and other terms of similar intent:
 - 1) Named products: Identified by the use of the manufacturer’s name for a product, including such items as a make or model designation as recorded in published product literature of the latest issue as of the date of the Contract Documents.
 - 2) Specified products: Same as Named Products.

1.4 QUALITY ASSURANCE

- A. Source Limitations:
 - 1. To the fullest extent possible, provide products of the same generic kind from a single source for each unit of work:
 - a. When it is discovered that specific products are available only from sources that do not or cannot produce an adequate quantity to complete Project requirements in a timely manner, consult with the Architect/Engineer for a determination of what product quantities are most important before proceeding. The Architect/Engineer will designate those qualities, such as visual, structural, durability, or compatibility

that are most important. When the Architect/Engineer's determination has been made, select products from those sources that produce products that possess the most important qualities to the fullest extent possible.

- B. Compatibility of Options:
 - 1. Compatibility of products is a basic requirement of product selection. When Contractor is given the option of selecting between two (2) or more products for use on the Project, the product selected must be compatible with other products previously selected, even if the products previously selected were also Contractor options. The complete compatibility between the various choices available to Contractor is not assured by the various requirements of the Contract Documents but must be provided by Contractor.
- C. Or Equal:
 - 1. Where the phrase "or equal," "or equivalent," "or Architects approved equal," or similar phrasing occurs in the Proposal Documents, do not assume that materials, equipment, or methods of construction will be approved by the Architect unless the item has been specifically approved for this Work by the Architect.
 - 2. The decision of the Architect shall be final.
- D. Where a proposed substitution involves the work of more than one (1) contractor, each contractor involved shall cooperate and coordinate the work with all other contractors involved, so as to provide uniformity and consistency and to assure the compatibility of products.
- E. Foreign Product Limitations:
 - 1. "Foreign products" as distinguished from "domestic products" are defined as products that are either manufactured substantially (50 percent or more of value) outside of the United States and its possessions, or produced or supplied by entities known to be substantially owned (more than 50 percent) by persons who are not citizens of, nor living within the United States and its possessions.
 - 2. Except under one (1) of the following conditions, select and provide domestic, not foreign, products for inclusion in the Work:
 - a. There is no domestic product available that complies with the requirements of the Contract Documents.
 - b. Available domestic products that comply with the requirements of the Contract Documents are available only at prices or other procurement terms that are substantially higher (25 percent or more) than for available foreign products that comply with the requirements of the Contract Documents.
 - c. At the discretion of Architect or Owner.
 - 3. Final determination and acceptance will be the responsibility of Architect.

1.5 SUBSTITUTIONS OF PRODUCTS

- A. The products described in the Proposal Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution. The materials and equipment named in, and the procedures covered by these Specifications have been selected as a standard because of quality, particular suitability, or record of satisfactory performance. It is not intended to preclude the use of equal or better materials or equipment, provided that same meets the requirements of the particular Project and is approved in an Addendum as a substitution prior to the submission of proposals.
- B. No substitution will be considered prior to receipt of proposals unless written request for approval has been received by the Architect at least seven (7) days prior to the date for receipt of proposals. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute

including Drawings, cuts, performance and test data, and any other information necessary for an evaluation. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

- C. If the Architect approves any proposed substitution prior to receipt of proposals, such approval will be set forth in an Addendum. Offerors shall not rely upon approvals made in any other manner.
- D. The Architect and Owner reserve the right to disapprove the use of any manufacturer who in their judgment is unsuitable for use on the Project and that decision will be final.
- E. The following are not considered as substitutions:
 - 1. Revisions to the Contract Documents, when requested by Owner, Architect, or any of their consultants are considered as changes, not substitutions.
 - 2. Specified Contractor options on products and construction methods included in Contract Documents are choices made available to Contractor and are not subject to the requirements specified in this Section for substitutions.
 - 3. Except as otherwise provided in the Contract Documents, Contractor's determination of and compliance with governing authorities does not constitute substitutions, nor does it constitute a basis for change orders.
- F. The following may be considered as a reason for a request for substitution:
 - 1. The request is directly related to an "or approved equal" clause or similar language in the Contract Documents.
 - 2. The specified product or method of construction cannot be provided within the Contract Time in accordance with the paragraph below concerning availability of specified items.
 - 3. The specified product or method of construction cannot receive necessary approval by a governing authority, but the requested substitution can be approved.
 - 4. A substantial advantage is offered to Owner, in terms of cost, time, energy conservation, or other consideration of merit, after deducting offsetting responsibilities Owner may be required to bear. These additional responsibilities may include such considerations as additional compensation to Architect/Engineer for redesign and evaluation services, the increased cost of other work by Owner or separate contractors, and similar considerations.
 - 5. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, but Contractor certifies that the substitution will overcome the incompatibility.
 - 6. The specified product or method of construction cannot be coordinated with other materials, but Contractor certifies that the proposed substitution can be coordinated with them.
 - 7. The specified product or method of construction cannot provide a warranty required by the Contract Documents, but Contractor certifies that the proposed substitution provides the required warranty.
- G. Availability of Specified Items:
 - 1. Verify prior to submittal of Proposal that all specified items will be available in time for installation during orderly and timely progress of the Work:
 - a. In the event specified items will not be so available, notify the Architect prior to receipt of Proposals. Submit Request for Substitutions in accordance with this Section.
 - b. The request will not be considered if the product or method cannot be provided as a result of Contractor's failure to pursue the Work promptly or coordinate activities properly.
 - 2. Costs of delays because of non-availability of specified items, when such delays could have been avoided by Contractor, will be back-charged as necessary and shall not be borne by Owner.

- H. A request constitutes a representation that Offeror:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for substitution as for specified product, except when inability to provide specified warranty is reason for request for substitution as described above.
 - 3. Will coordinate installation and make changes to other work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Will reimburse Owner and pay for all costs, including Architect/Engineer's redesign and evaluation costs resulting from the use of the proposed substitution, or for review or redesign of services associated with re-approval by authorities having jurisdiction.

- I. No substitutions will be considered after the Award of Contract.

1.6 SUBSTITUTION REQUEST SUBMITTAL

- A. Requests for Substitutions:
 - 1. Submit three (3) copies of each request for substitution. In each request, identify the product or fabrication or installation method to be replaced by the substitution. Include related Specifications Section and Drawing numbers, and complete documentation showing compliance with the requirements for substitutions. Include, as appropriate, with each request, the following information:
 - a. Product data, drawings, and descriptions of products, fabrication, and installation procedures.
 - b. Samples, where applicable or requested.
 - c. A detailed comparison of the significant qualities of the proposed substitution with those of the Work originally specified. Significant qualities may include elements such as size, weight, durability, performance, and visual effect, where applicable.
 - d. Coordination information, including a list of changes or modifications needed by other parts of the Work and to construction performed by Owner and separate contractors that will become necessary to accommodate the proposed substitution.
 - e. A statement indicating the effect the substitution will have on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any, in the Contract Sum.
 - g. Certification by Contractor to the effect that, in Contractor's opinion, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal to, or better than, the Work required by the Contract Documents, and that it will perform adequately in the application indicated. Include Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
 - h. A statement indicating that Contractor will reimburse Owner and pay for all costs, including Architect/Engineer's re-design and evaluation costs resulting from the use of the proposed substitution.

- B. Work-Related Submittals: Contractor's submittal of, and Architect/Engineer's acceptance of, shop drawings, product data, or samples related to work not complying with the Contract Documents, does not constitute an acceptance or valid request for a substitution, nor approval thereof.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General:
1. Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft. Control to prevent overcrowding of construction spaces or overloading of structure. In particular, coordinate delivery and installation to ensure minimum holding or storage times for items known or recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss:
 - a. Deliver products to the site in the manufacturer's sealed containers or other packaging system, complete with labels intact, and instructions for handling, storage, unpacking, installing, cleaning, and protecting.
 - b. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.
 - c. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
 - d. Store products at the site or in a bonded and insured off-site storage facility or warehouse in a manner that will facilitate inspection and measurement of quantity or counting of units. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
 - e. Store heavy materials away from the Project structure or in a manner that will not endanger the supporting construction.

PART 2 PRODUCTS

2.1 GENERAL PRODUCT COMPLIANCE

- A. General:
1. Requirements for individual products are indicated in the Contract Documents; compliance with these requirements is in itself a Contract requirement. These requirements may be specified in any one (1) of several different specifying methods, or in any combination of these methods. These methods include the following:
 - a. Proprietary.
 - b. Descriptive.
 - c. Performance.
 - d. Compliance with Reference Standards.
 2. Compliance with codes, compliance with graphic details, allowances, and similar provisions of the Contract Documents also have a bearing on the selection process.
- B. Procedures for Selecting Products:
1. Contractor's options in selecting products are limited by requirements of the Contract Documents and governing regulations. They are not controlled by industry traditions or procedures experienced by Contractor on previous construction projects. Required procedures include, but are not limited to, the following for the various indicated methods of specifying:
 - a. Proprietary and semi-proprietary Specification requirements:
 - 1) Single product name: Where only a single product or manufacturer is named, provide the product indicated, unless the Specification indicates the possible consideration of other products. Advise Architect/Engineer before proceeding, when it is discovered that the named product is not a reasonable or feasible solution.
 - 2) Two (2) or more product names: Where two (2) or more products or manufacturers are named, provide one (1) of the products named, at Contractor's option. Exclude products that do not comply with Specification requirements. Do not provide or offer to provide an unnamed product, unless the Specification indicates the possible consideration of other products.

Advise Architect/Engineer before proceeding where none of the named products comply with Specification requirements or are not feasible for use. Where products or manufacturers are specified by name, accompanied by the term "or approved equal" or similar language, comply with this Section regarding substitutions to obtain approval from Architect/Engineer for the use of an unnamed product.

- b. Nonproprietary Specification requirements: Where the Specifications name products or manufacturers that are available and may be incorporated in the Work, but do not restrict Contractor to the use of these products only, Contractor may, at his option, use any available product that complies with the Contract requirements.
 - c. Descriptive Specification requirements: Where the Specifications describe a product or assembly generically, in detail, listing the exact characteristics required, but without use of a brand name, provide products or assemblies that provide the characteristics indicated and otherwise comply with Contract requirements.
 - d. Performance Specification requirements: Where the Specifications require compliance with indicated performance requirements, provide products that comply with the specific performance requirements indicated, and that are recommended by the manufacturer for the application indicated. The manufacturer's recommendations may be contained in published product literature, or by the manufacturer's individual certification of performance. General overall performance of a product is implied where the product is specified for specific performances.
 - e. Compliance with standards, codes, and regulations: Where the Specifications require only compliance with an imposed standard, code, or regulation, Contractor has the option of selecting a product that complies with Specification requirements, including standards, codes, and regulations.
 - f. Visual matching: Where matching an established sample is required, the final judgement of whether a product proposed by Contractor matches the sample satisfactorily will be determined by Architect. Where there is no product available within the specified product category that matches the sample satisfactorily and also complies with other specified requirements, comply with the provisions of this Section regarding substitutions and other Contract Documents for change orders for the selection of a matching product in another product category, or for noncompliance with specified requirements.
 - g. Visual selection: Except as otherwise indicated, where specified product requirements include the phrase "...as selected from the manufacturer's standard colors, patterns, textures..." or similar phrases, Contractor has the option of selecting the product and manufacturer, provided the selection complies with other specified requirements. Architect is subsequently responsible for selecting the color, pattern, and texture from the product line selected by Contractor.
 - h. Allowances: Refer to individual Sections of the Specifications for an indication of product selections that are controlled by established allowances, and for the procedures required for processing such selections.
- C. Producer's Statement of Applicability: Where individual Specification Sections indicate products that require a "Statement of Applicability" from the manufacturer or other producer, submit a written certified statement from the producer stating that the producer has reviewed the proposed application of the product on the Project. This statement shall affirm that the producer agrees with, or does not object to, Architect/Engineer's Specification, and that Contractor's selection of the product on the Project is suitable and proper.

2.2 SUBSTITUTIONS

- A. Condition: Contractor's request for substitution will be received and considered when extensive revisions to Contract Documents are not required, when the proposed changes are in keeping with the general intent of the Contract Documents, when the request is timely, fully documented and properly submitted, and when one (1) or more of the above

conditions are satisfied, all as judged and determined by Architect/Engineer; otherwise, the requests will be returned without action except to record noncompliance with these requirements.

PART 3 EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. General: Except as otherwise indicated in individual Sections of these Specifications, comply with the manufacturer's instructions and recommendations for installation of the products in the applications indicated.
- B. Anchor each product securely in place, accurately located, and aligned with other work.
- C. Clean exposed surfaces and protect surfaces as necessary to ensure freedom from damage and deterioration at time of acceptance.
- D. Products and assemblies shall be installed complete, in-place, watertight, and structurally sound.

3.2 INSTALLATION OF APPROVED SUBSTITUTIONS

- A. Coordinate all approved substitutions with adjacent work.
- B. Comply with the manufacturer's and/or supplier's instructions and recommendations for installation of the products in the applications indicated.
- C. Provide all items required by manufacturer and/or supplier regarding installation, i.e. supplemental supports, anchors, fasteners, painting, etc., whether or not indicated or specified.

END OF SECTION 01 25 13

SECTION 01 26 13 REQUEST FOR INFORMATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural provisions for preparation, submittal and response to Contractor's Request for Information (RFI's) during construction of project.
- B. Related Sections:
 - 1. General Conditions of the Contract.

1.3 DEFINITIONS

- A. PDF, Portable Document Format: An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- B. RFI, Request for Information: Request from Contractor seeking information required by or clarification of the Contract Documents.

1.4 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Submit RFI's via email as PDF electronic files. Architect will not act on any RFI's until 7 days following the submission of the Schedule of Values per Division 01 Section "Payment Procedures."
 - 1. RFI Form: Use RFI form included at end of this Section or form acceptable to Architect. Upon request from the Contractor, the form at the end of this section will be made available in WORD format from the Architect.
 - 2. Attachments: Attachments shall be in PDF electronic file format.

1.5 REQUESTS FOR INFORMATION (RFIS)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 - 1. Project name.
 - 2. Project number.
 - 3. Date.
 - 4. Name of Contractor.
 - 5. Name of Architect
 - 6. RFI number, numbered sequentially.
 - 7. RFI subject.

8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow 10 working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
 4. Distribution: One electronic copy of each completed RFI review shall be distributed by the Architect to the Contractor and the Owner.
- D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the sequential RFI number. Submit log weekly unless otherwise directed in writing by Architect. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within 7 days if Contractor disagrees with response.
- F. Contractor's Expense for RFI's: Architect will review and respond to legitimate RFI's at no additional cost to the Contractor. RFI's determined by the Architect to be flagrant or unnecessary will have the expense for the Architect's time paid by the Owner with the amount being deducted from the Contract Sum. The expense will be based on an hourly rate in accordance with the Architect's standard hourly rate schedule in effect at the time the work is performed with a minimum of one hour for each flagrant or unnecessary RFI.

PBK Architects
Project No. 250537

Fire Station No. 40 Kitchen Remodel
Coastside Fire Protection District

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 26 13

CONTRACTOR'S REQUEST FOR INFORMATION

RFI #

From: _____ Project Number: _____ Date: __

To: Project: _____

Disciplines Impacted: Architectural [] Structural [] Mechanical [] Electrical []
Civil [] Landscape [] Kitchen []

Reference: _____ Drawing(s) _____ Spec. Section(s)

Other

Please clarify or provide the following information:

Contractor's Suggestions: _____

Possible Cost Impact: Unknown [] Increase [] Decrease [] No Change [

Possible Time Impact: Unknown [] Increase [] Decrease [] No Change [

This information is required as soon as possible,
but no later than _____

**[] PRIORITY ATTENTION
REQUIRED**

Contractor's Representative:

Architect's Response:

Date: _____

PBK Architects

Copies _____

SECTION 01 29 00 PAYMENT PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

- A. Pencil Copy: A copy submitted prior to a final/official.
- B. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination:
 - 1. Coordinate preparation of the schedule of values with preparation of Contractor's Construction Schedule:
 - a. Coordinate line items in the schedule of values with administrative forms and schedules, including the following:
 - 1) Application for Payment forms with continuation sheets.
 - 2) Updated submittal schedule.
 - 3) Items required to be indicated as separate activities in updated Contractor's Construction Schedule.
 - b. Submit the schedule of values to Architect at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment. Contractor's standard form or electronic media printout will be considered but must be approved by Owner.
- B. Format and Content:
 - 1. Use Project manual table of contents as a guide to establish line items for the schedule of values. Provide at least one (1) line item for each Specification Section:
 - a. Identification:
 - 1) Include the following Project identification on the schedule of values:
 - a) Project name and location.
 - b) Name of Architect.
 - c) Architect's Project number.
 - d) Contractor's name and address.
 - e) Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Documents G702/G703.
 - 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of Subcontractor.

- d. Name of manufacturer or fabricator.
- e. Name of supplier.
- f. Change Orders (numbers) that affect value.
- g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent (.01%), adjusted to total 100 percent:
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment rentals.
 - 4) General Conditions:
 - a) Supervisor.
 - b) Submittals.
 - c) Closeout.
 - d) Field Engineering.
 - e) Daily Clean-up.
 - f) Final Clean-up.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed:
 - a. Differentiate between items stored on site and items stored off site. Include evidence of insurance.
6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line item value of unit cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item:
 - a. Temporary facilities and other major cost items that are not direct cost of actual Work in place may be shown either as separate line items in the schedule of values or distributed as general overhead expense.
8. Schedule updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATION FOR PAYMENT

- A. Submit preliminary (pencil) copy of proposed values to PBK Construction Field Representative and Owner for review by the 20th of the month. Allow four (4) days for comments. Schedule review of the pencil copy during bi-monthly site visits.
- B. Once preliminary (pencil) approved, submit four (4) notarized originals of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702 or other similar form approved by Owner.
- C. Content and Format: Utilize schedule of values for listing items in Application for Payment.
- D. Submit updated construction or recovery schedule with each Application for Payment.
- E. Payment Period: Submit at intervals stipulated in Owner/Contractor Agreement. Include Supplementary Conditions of the Contract.
- F. Only materials stored on the Project site shall be paid for unless the materials are stored in a bonded warehouse agreed upon by Owner. Periodic review of stored item will be required by the inspector of record.
- G. Substantiating Data:

1. When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Items that may be requested by Architect or Owner to substantiate costs include, but are not limited to the following:
 - a. Current Record Documents as specified in Section 01 77 00: Closeout Procedures.
 - b. Labor time sheets, purchase orders, or similar documentation.
 - c. Affidavits attesting to products stored off-site.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 29 00

SECTION 01 29 73 SCHEDULE OF VALUES - SAMPLE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes: Schedule of values listing to be edited by Contractor of description of Work, not scheduled value, Work completed, stored materials, total complete, percentage, balance to finish, and retainage. These parts must remain intact.
- B. Related Sections:
 - 1. Section 01 29 00: Payment Procedures.

1.3 DEFINITIONS

- A. Pencil Copy: A copy submitted prior to a final/official submission on a monthly basis.
- B. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

MATRIX TO START ON NEXT PAGE:

This is a sample illustration:

Item No.	Description of Work	Scheduled Value	Work Completed		Stored Materials	Total Completed	%	Balance To Finish	Retainage
			Previous App.	This App.					
	Div. 1 - General Reqs. Site Work General Conditions Supervision Mobilization Bonds & Insurance Permits Contractor's Fee Closeout Documents								
	Div. 1 - Total								
	Div. 2 - Existing Conditions Demolition (As applicable) Erosion Control Div. 2 - Total								
	Div. 3 - Concrete Drill Piers Caps & Beams Slab on Grade Cooling Tower Basin Misc Bldg Conc Floor Sealer Rebar Matl Rebar Labor Lt.Wt.Insul Fill - Materials Lt.Wt.Insul Fill - Labor Submittals/Closeout Documents Supervision Clean-up								
	Div. 3 - Total Div 4 - Masonry Brickwork - Labor Brickwork - Matls Concrete Masonry - Labor Concrete Masonry - Materials Str. Glazed Tile-Labor Str. Glazed Tile-Materials Submittals/Closeout Documents Supervision Clean-up								
	Div. 4 - Total								
	Div 5 - Metals Structural Steel - Labor Structural Steel - Materials Alternating Stairs Misc. Steel - Materials Steel Joists - Materials Lt. Gauge Steel Framing-Labor Lt. Gauge Steel Framing-Matls Metal Decking - Labor Expansion Joint Covers								

Item No.	Description of Work	Scheduled Value	Work Completed		Stored Materials	Total Completed	%	Balance To Finish	Retainage
			Previous App.	This App.					
	Detailing Submittals/Closeout Documents Supervision Clean-up								
	Div. 5 - Total								
	Div. 6 - Wood & Plastics Rough Carpentry - Labor Rough Carpentry - Materials Millwork - Labor Millwork - Materials Submittals/Closeout Documents								
	Div. 6 - Total								
	Div. 7 - Thermal and Moisture Protection Waterpfng / Dampprfng-Matls Waterpfng / Dampprfng-Labor Building Insulation - Labor Building Insulation - Materials Fireproofing - Labor Fireproofing - Materials Metal Roof - Labor Metal Roof - Materials Metal Roof Guarantee Built-up Roofing-Labor Built-up Roofing-Materials Built-up Roofing Guarantee Roof Accessories Building Sheet Metal - Labor Building Sheet Metal - Matls Bldg. Sheet Metal Guarantee Roof Curbs Roof Hatches Sealants Submittals/Closeout Documents Supervision Clean-up								
	Div. 7 - Total								
	Div. 8 - Doors and Frames Finish Carpentry/Door - Labor Finish Hardware - Matls Thresholds & Seals - Matls+B66 Hollow Metal Doors & Frames - Matls Plastic Faced Doors-Matls Overhead Doors & Grilles-Labor Overhead Doors & Grilles - Matls Alum. Entrances & Store-fronts - Labor								

Item No.	Description of Work	Scheduled Value	Work Completed		Stored Materials	Total Completed	%	Balance To Finish	Retainage
			Previous App.	This App.					
	fronts - Matls Alum. Windows - Labor Alum Windows - Matls Glass & Glazing-Labor Glass & Glazing-Matls Submittals/Closeout Documents Supervision Clean-up								
	Div. 8 - Total								
	Div. 9 - Finishes Lath & Plaster-Labor Lath & Plaster-Matls Gypsum Wallboard Systems - Labor Gypsum Wallboard Systems - Matls Ceramic Tile - Labor Ceramic Tile - Matls Quarry Tile - Labor Quarry Tile - Matls Terrazzo-Labor Terrazzo-Matls Acoustic Clg. - Labor Acoustic Clg. - Matls Acoustic Wall Panels Resilient Flooring - Labor Resilient Flooring - Matls Carpet - Labor Carpet - Matls Athletic Flooring - Materials Athletic Flooring - Labor Floor Sealer Painting - Labor Painting - Mtls Submittals/Closeout Documents Supervision Clean-up								
	Div. 9 - Total								
	Div. 10 - Specialties Visual Display Boards & Tackboards - Materials Visual Display Boards & Tackboards - Labor Toilet Partitions - Labor Toilet Partitions - Matls Louvers Aluminum Flag Pole Graphics Lockers Cubicle Curtains & Track Fire Extinguisher Cabinets Demountable Partitions-Labor								

Item No.	Description of Work	Scheduled Value	Work Completed		Stored Materials	Total Completed	%	Balance To Finish	Retainage
			Previous App.	This App.					
	Demountable Partitions-Matls Shelving Toilet Room Accessories-Matls Toilet Room Accessories-Lbr Submittals/Closeout Documents Supervision Clean-up								
	Div. 10 - Total								
	Div. 11 - Equipment Stage Curtains Misc. Appliances Food Service Eqpt-Labor Food Service Eqpt-Matls Submittals/Closeout Documents Supervision Clean-up								
	Div. 11 - Total								
	Div. 12 - Furnishings Horizontal Blinds Projection Screens Casework - Labor Casework - Matls Science Casework - Labor Science Casework - Matls Submittals/Closeout Documents Supervision Clean-up								
	Div. 12 - Total								
	Div. 13 - Specialties Stage Curtains and Draperies Music Instrument Storage Bleachers Press Box Pre-eng. Metal Bldg. Stadium Seating Submittals/Closeout Documents Supervision Clean-up								
	Div. 13 - Total								
	Div. 14 - Conveying Systems Platform Lifts Elevators Submittals/Closeout Documents Supervision Clean-up								
	Div. 14 - Total								
	Div. 21, 22 - Plumbing Shop Drawings As-Builts/Closeout/ O&M Manuals Sanitary Underground – Labor								

Item No.	Description of Work	Scheduled	Work Completed		Stored	Total	%	Balance	Retainage
		Value	Previous	This	Materials	Completed		To Finish	
			App.	App.					
	Sanitary Underground - Mats								
	Storm Underground - Labor								
	Storm Underground - Mats								
	Domestic Water - Labor								
	Domestic Water - Mats								
	Plumbing Insulation - Mats								
	Plumbing Insulation - Labor								
	Gas Piping - Mats								
	Gas Piping - Labor								
	Grease Trap								
	Plumbing Fixtures - Mats								
	Plumbing Fixtures - Labor								
	Coordination Drawings								
	Submittals/Closeout Documents								
	Supervision Clean-up								
	Div. 21, 22 Plumbing - Total								
	Div. 23 - Mechanical								
	Shop Drawings								
	As-Builts/Closeout/ O&M Manuals								
	Chillers - Mats								
	Chillers - Labor								
	Cooling Towers - Mats								
	Cooling Towers - Labor								
	Boilers - Mats								
	Boilers - Labor								
	AHU's - Mats								
	AHU's - Labor								
	Fans - Mats								
	Fans - Labor								
	Grilles - Mats								
	Grilles - Labor								
	Ductwork - Mats								
	Ductwork - Labor								
	Pumps - Mtls								
	Pumps - Labor								
	Water Treatment - Labor								
	Water Treatment - Mats								
	Isolation - Labor								
	Isolation - Mats								
	Pipe Flex - Mats								
	Pipe Flex - Labor								
	Connections								
	Sheet Metal - Mats								
	Sheet Metal - Labor								
	Duct Insulation - Mats								
	Duct Insulation - Labor								

Item No.	Description of Work	Scheduled Value	Work Completed		Stored Materials	Total Completed	%	Balance To Finish	Retainage
			Previous App.	This App.					
	Pipe Insulation - Mats Pipe Insulation - Labor VAV Boxes - Materials VAV Boxes - Labor Refrigerant Monitor - Mats Refrigerant Monitor - Labor Unit Heaters - Materials Unit Heaters - Labor Startup Controls - Mats Control - Labor Engineer / Submittals Modules / End Devices Low Voltage Wiring Startup Closeout Documents Fire Sprinkler Engineer / Submittals Piping - Materials Piping - Labor Equipment - Materials Equipment - Labor Trimout - Materials Trimout - Labor Pipe, Valves, Fittings - Labor Pipe, Valves, Fittings - Mats Misc. - Mats Insulation - Mats Insulation - Labor Sanitary Above Slab-Labor Sanitary Above Slab-Mats Storm Above Slab - Labor Storm Above Slab - Mats Gas - Labor Gas - Mats Fixtures - Labor Fixtures - Mats Permits Coordination Drawings Submittals/Closeout Documents Supervision Clean-up								
	Div. 23 Mechanical - Total								
	Div. 26 - Electrical Mobilization+B220 Shop Drawings As-Builts/Closeout/ O&M Manuals Underground Conduit - Labor Conduit - Matl Wire - Labor								

Item No.	Description of Work	Scheduled Value	Work Completed		Stored Materials	Total Completed	%	Balance To Finish	Retainage
			Previous App.	This App.					
	Wire - Matls Feeder Wire - Labor Feeder Wire - Matls Switches/Recpt. Switchgear - Labor Switchgear - Matls Temporary - Materials Temporary - Labor Gas Generator - Materials Gas Generator - Labor Fixtures - Labor Fixtures - Matls Communications - Labor Communications - Matls Fire Alarm - Labor Fire Alarm - Matls Security - Labor Security - Matls Low Voltage Ltng Sys-Matls Low Voltage Ltng Sys-Labor Voice System - Materials Voice System - Labor Video System - Materials Video System - Labor Data System - Materials Data System - Labor Master Clock - Materials Master Clock - Labor+B277 Coordination Drawings Submittals/Closeout Documents Supervision Clean-up								
	Div. 26 - Total								
	Divs. 31, 32 and 33 - Earthwork, Exterior Improvements and Utilities								
	Site Clearing & Grubbing Building Pad - Materials Building Pad - Labor Paving Subgrade Signage / Striping Bike Racks Landscaping - Materials Landscaping - Labor Hydro Mulch - Materials Hydro Mulch - Labor Irrigation - Materials Irrigation - Labor Earthwork Finish Grading Stabilization - Materials Stabilization - Labor Site Drainage - Materials Site Drainage - Labor								

Item No.	Description of Work	Scheduled Value	Work Completed		Stored Materials	Total Completed	%	Balance To Finish	Retainage
			Previous App.	This App.					
	Chain Link Fence-Materials Chain Link Fence-Labor Paving - Labor Paving - Materials Sidewalks Submittals/Closeout Documents Supervision Clean-up								
	Div. 31, 32 and 33 - Total								
	General Conditions Mobilization Temp. Facilities Final Cleaning Record Documents/Closeout/ O&M Manuals Supervision Permits Bonds Insurance Allowances Alternates (list) Change Orders A. PR# B. PR# C. PR#								

END OF SECTION 01 29 73

SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - a. General coordination procedures.
 - b. Coordination drawings.
 - c. Pre-installation meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Contractor shall make a reasonable attempt to interpret the Contract Documents before asking the Architect for assistance in interpretation. Requests for Information (RFI) will not be allowed from Sub-Contractors. The Contractor is to evaluate the Sub-Contractor's request and respond if the Contractor deems necessary the RFI will be forwarded to the Architect for a evaluation and response. The Contractor shall arrange the necessary meeting in the field with appropriate Architect's field representative(s) to obtain clarification as needed on items that may need interpretation, clarification and respond appropriately.

1.3 SUBMITTALS

- A. Subcontract List:
 - 1. Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - a. Name, address, and telephone number of entity performing subcontract or supplying products.
 - b. Number and title of related Specification Section(s) covered by subcontract.
 - c. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names:
 - 1. Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and the duties and responsibilities; list address, telephone numbers (home, office, and cellular), and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project:
 - a. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.4 COORDINATION PROCEDURES

- A. Coordinate construction operations to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations that depend on each other for proper

installation, connection, and operation:

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include items as required notices, reports, and list of attendees at meetings:
1. Prepare similar memoranda for Owner and separate contractors if coordination of the Work is required.
- C. Administrative Procedures:
1. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Administrative activities include, but are not limited to, the following:
 - a. Preparation of Contractor's Construction Schedule.
 - b. Preparation of the schedule of values.
 - c. Installation and removal of temporary facilities and controls.
 - d. Delivery and processing of submittals.
 - e. Progress meetings.
 - f. Pre-installation conferences.
 - g. Project closeout activities.
 - h. Startup and adjustment of systems.
 - i. Coordinating inspections and other jurisdictional requirements.
 - j. Coordinate OFCI equipment.
 - k. Action items and issue logs.
- D. Conservation:
1. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste:
 - a. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to the Specifications Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General:
1. Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on shop drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity:
 - a. Content:
 - 1) Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a) Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b) Coordinate the addition of trade specific information to the coordination drawings by multiple contractors in sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.

- c) Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d) Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e) Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f) Indicate required installation sequences.
 - g) Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization:
1. Floor plans and reflected ceiling plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan Drawings with section drawings where required to adequately represent the Work.
 2. Plenum space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures, ductwork, piping, and other components.
 3. Mechanical rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire protection, fire-alarm, and electrical equipment.
 4. Structural penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab edge and embedded items: Indicate slab edge locations and sizes, and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and plumbing work - Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts, and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 7. Electrical work - Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 - e. Floor boxes.
 8. Fire protection system - Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, sprinkler heads, and inspector test locations.
 9. IDF/MDF rooms: Communications and low voltage (security, data, phone, etc.) audio.
 10. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
 11. Coordination drawing prints: Prepare coordination drawing prints according to

requirements in Section 01 33 00: Submittal Procedures.

- C. Coordination Digital Data Files:
1. Prepare coordination digital data files according to the following requirements:
 - a. File preparation format: Same digital data software program, version, and operating system as original Drawings.
 - b. File submittal format: Submit or post coordination drawing files using same format as file preparation.
 - c. BIM file incorporation:
 - 1) Develop and incorporate coordination drawing files into Building Information Model established for Project:
 - a) Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
 - d. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files:
 - 1) Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - 2) Digital data software program: Drawings are available in Revit.
 - 3) Contractor shall execute a data licensing agreement in the form of AIA Document C106.

1.6 PROJECT MEETINGS

- A. Schedule and conduct meetings and conferences at Project site unless otherwise indicated:
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Architect to prepare the meeting agenda and distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
 4. Action items: An element of work, design, research, or other task to be completed before a specific date or time, such as before a subsequent meeting of involved parties.
 5. Issue logs: Documentation element of software project management and contains a list of ongoing and closed issues of the Project.
- B. Kick-off and Preconstruction Conference:
1. Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect:
 - a. Conduct the conference to review responsibilities and personnel assignments.
 - b. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
 - c. Agenda: Discuss items of significance that affect progress.
 - d. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
 - e. Action items: An element of work, design, research, or other task to be completed before a specific date or time, such as before a subsequent meeting of involved parties.

- C. Pre-Installation Conferences:
1. Conduct a pre-installation trade conference at site before each construction activity that requires coordination with other construction trades:
 - a. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Engineer of Record of scheduled meeting dates.
 - b. Agenda: Contractor to review progress of other construction activities and preparations for the particular activity under consideration.
 - c. Contractor to record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - d. Reporting: Contractor to distribute minutes of the meeting to each party present and to other parties requiring information.
 - e. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
 - f. Action items: An element of work, design, research, or other task to be completed before a specific date or time, such as before a subsequent meeting of involved parties.
- D. Project Closeout Conference:
1. Schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion:
 - a. Conduct the conference to review requirements and responsibilities related to Substantial Completion.
 - b. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
 - c. Agenda: Discuss items of significance that could affect or delay Project closeout.
 - d. Minutes: Entity conducting meeting will record and distribute meeting minutes.
 - e. Action items: An element of work, design, research, or other task to be completed before a specific date or time, such as before a subsequent meeting of involved parties.
- E. Progress Meetings:
1. Conduct progress meetings at weekly intervals:
 - a. Coordinate dates of meetings with preparation of payment requests.
 - b. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
 - c. Agenda:
 - 1) Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of the Project:
 - a) Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - d. Minutes:

- 1) Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information:
 - a) Schedule updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
 - b) Six (6) week look-ahead schedules. This may be altered to three (3) week look-ahead as part of an action item when Architect/District request:
 - i. Action items: An element of work, design, research, or other task to be completed before a specific date or time, such as before a subsequent meeting of involved parties.
- F. Coordination Meetings:
1. Conduct coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences:
 - a. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with the Project and authorized to conclude matters relating to the Work.
 - b. Agenda:
 - 1) Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of the Project:
 - a) Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b) Schedule updating: Revise combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c) Review present and future needs of each contractor present.
 - c. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
 - d. Action items: An element of work, design, research, or other task to be completed before a specific date or time, such as before a subsequent meeting of involved parties.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 31 00

SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Requirements for the submittal schedule and administrative and procedural requirements for submitting shop drawings, product data, samples, and other submittals.

1.3 DEFINITIONS

- A. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- B. Portable Document Format (PDF): An open standard file format used for representing documents in a device and display resolution independent fixed layout document format.
- C. Submittals: Written and graphic information and physical samples that require Architect's responsive action, or are for information and do not require Architect's action.

1.4 SUBMITTALS

- A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections:
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's Construction Schedule.
 - 2. Initial submittal: Submit concurrently with construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files:
 - 1. Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals:
 - a. Upon request, Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing shop drawings and Project record drawings:

- 1) Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - 2) Digital drawing software program: The Contract Drawings are available in Revit.
 - 3) Contractor shall execute a data licensing agreement in the form of AIA Document C106, Digital Data Licensing Agreement.
 - 4) The following digital data files will be furnished for each appropriate discipline:
 - a) Floor plans.
 - b) Reflected ceiling plans.
- B. Coordination:
1. Coordinate preparation and processing of submittals with performance of construction activities:
 - a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - b. Submit submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - c. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - d. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination:
 - 1) Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time:
1. Allow time for submittal review, including time for resubmittals. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals:
 - a. Initial review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - b. Intermediate review: If intermediate submittal is necessary, process in same manner as initial submittal.
 - c. Resubmittal review: Allow 15 days for review of each resubmittal.
 - d. Sequential review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 - e. Concurrent consultant review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- D. Electronic Submittals:
1. Identify and incorporate information in each electronic submittal file:
 - a. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - b. Name file with submittal number or other unique identifier, including revision identifier:
 - 1) File name shall use Project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., SLOHSM-06 10 00.01). Resubmittals shall include an alphabetic suffix after another

- decimal point (e.g., SLOHSM-06 10 00.01.A).
- c. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
 - d. Transmittal form for electronic submittals:
 - 1) Use software generated form from electronic project management software acceptable to Owner, containing the following information:
 - a) Project name.
 - b) Date.
 - c) Name and address of Architect.
 - d) Name of Construction Manager.
 - e) Name of Contractor.
 - f) Name of firm or entity that prepared submittal.
 - g) Names of Subcontractor, manufacturer, and supplier.
 - h) Category and type of submittal.
 - i) Submittal purpose and description.
 - j) Specification Section number and title.
 - k) Specification paragraph number or Drawing designation and generic name for each of multiple items.
 - l) Drawing number and detail references, as appropriate.
 - m) Location(s) where product is to be installed, as appropriate.
 - n) Related physical samples submitted directly.
 - o) Indication of full or partial submittal.
 - p) Transmittal number, numbered consecutively.
 - q) Submittal and transmittal distribution record.
 - r) Other necessary identification.
 - s) Remarks.
 - e. Metadata:
 - 1) Include the following information as keywords in the electronic submittal file metadata:
 - a) Project name.
 - b) Number and title of appropriate Specification Section.
 - c) Manufacturer name.
 - d) Product name.
- E. Options: Identify options requiring selection by Architect.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals:
 1. Make resubmittals in same form and number of copies as initial submittal:
 - a. Note date and content of previous submittal.
 - b. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - c. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on the Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. Submittal Procedure Requirements:
 - 1. Prepare and submit submittals required by individual Specification Sections:
 - a. Submit electronic submittals via email as PDF electronic files:
 - 1) Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 - b. Submittals: Submit three (3) paper copies of each submittal unless otherwise indicated. Architect will return two (2) copies.
 - c. Certificates and certifications submittals:
 - 1) Provide statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity:
 - a) Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b) Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data:
 - 1. Collect information into a single submittal for each element of construction and type of product or equipment:
 - a. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as shop drawings, not as product data.
 - b. Mark each copy of each submittal to show which products and options are applicable.
 - c. Include the following information, as applicable:
 - 1) Manufacturer's catalog cuts.
 - 2) Manufacturer's product specifications.
 - 3) Standard color charts.
 - 4) Statement of compliance with specified referenced standards.
 - 5) Testing by recognized testing agency.
 - 6) Application of testing agency labels and seals.
 - 7) Notation of coordination requirements.
 - 8) Availability and delivery time information.
 - d. For equipment, include the following in addition to the above, as applicable:
 - 1) Wiring diagrams showing factory installed wiring.
 - 2) Printed performance curves.
 - 3) Operational range diagrams.
 - 4) Clearances required to other construction, if not indicated on accompanying shop drawings.
 - e. Submit product data before or concurrent with samples.
 - f. Submit product data in PDF electronic file.
- C. Shop Drawings:
 - 1. Prepare Project specific information, drawn accurately to scale. Do not base shop drawings on reproductions of the Contract Documents or standard printed data:
 - a. Preparation:
 - 1) Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a) Identification of products.
 - b) Schedules.
 - c) Compliance with specified standards.
 - d) Notation of coordination requirements.
 - e) Notation of dimensions established by field measurement.

- f) Relationship and attachment to adjoining construction clearly indicated.
 - g) Seal and signature of professional Engineer if specified.
 - b. Sheet size: Except for templates, patterns, and similar full-size drawings, submit shop drawings on sheets size indicated in Specification Section.
 - c. Submit shop drawings in PDF electronic file.
 - D. Samples:
 - 1. Submit samples for review of kind, color, pattern, and texture for a check of characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed:
 - a. Transmit samples that contain multiple related components, such as accessories, together in one submittal package.
 - b. Identification:
 - 1) Attach label on unexposed side of samples that includes the following:
 - a) Generic description of sample.
 - b) Product name and name of manufacturer.
 - c) Sample source.
 - d) Number and title of applicable Specification Section.
 - e) Specification paragraph number and generic name of each item.
 - c. For projects where electronic submittals are required, provide corresponding electronic submittal of sample transmittal, digital image file illustrating sample characteristics, and identification information for record:
 - 1) Disposition: Maintain sets of approved samples at the Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - 2) Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such samples must be in an undamaged condition at time of use.
 - 3) Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 - d. Submit full size units or samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following:
 - 1) Partial sections of manufactured or fabricated components.
 - 2) Small cuts or containers of materials.
 - 3) Complete units of repetitively used materials.
 - 4) Swatches showing color, texture, and pattern.
 - 5) Color range sets.
 - 6) Components used for independent testing and inspection:
 - a) Number of samples - Submit three (3) sets of samples. Architect will retain two (2) sample sets; remainder will be returned:
 - i. Submit a single sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - ii. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- E. Product Schedule:
 - 1. As required in individual Specification Section, prepare a written summary indicating types of products required for the Work and their intended locations. Include the following information in tabular form:
 - a. Type of product. Include unique identifier for each product indicated in the Contract

- Documents or assigned by Contractor if none is indicated.
- b. Manufacturer, product name, and model number if applicable.
 - c. Number and name of room or space.
 - d. Location within room or space.
 - e. Submit product schedule in PDF electronic file.
- F. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00: Payment Procedures.
- G. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 45 23: Testing and Inspecting Services.
- H. Closeout Submittals required for Substantial Completion: Comply with requirements specified in Section 01 77 00: Closeout Procedures.
- I. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- J. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- K. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that the installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- L. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- O. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- P. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- Q. Research Reports:
 1. Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with the building code in effect for the Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.

- e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.
- R. Pre-Construction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product for compliance with performance requirements in the Contract Documents.
- S. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- T. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location for compliance with requirements in the Contract Documents.
- U. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria:
- 1. Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated:
 - a. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Certification:
- 1. In addition to shop drawings, product data, and required submittals, submit digitally signed PDF electronic file and three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional:
 - a. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
 - 1. Reviewed: Indicates the Architect has reviewed the submittal and takes no exceptions as submitted.
 - 2. Furnish as Corrected: Submittal is approved, provided modifications noted are properly incorporated. Resubmission is not usually necessary.
 - 3. Revised and Resubmit: Modifications are required prior to approval. Work cannot proceed until the submittal is revised and resubmitted for further review.
 - 4. Rejected: Work covered by the submittal is not complete or does not conform the contract documents and cannot proceed. A new submittal needs to be made according to the notations and resubmitted for approval prior to fabrication or construction.
- B. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- C. Incomplete submittals are not permitted, will be considered nonresponsive, and will be returned for resubmittal without review.
- D. Submittals not required by the Contract Documents will be returned by Architect without action.

END OF SECTION 01 33 00

SECTION 01 40 00 QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated and paid by the District (or refer to Section 01 45 23: Testing and Inspecting Services). These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements:
 - 1. Specific quality assurance and quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with Contract Document requirements.
 - 3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, experienced means having successfully completed a minimum of five (5) years' documented experience with projects similar in nature, size, and extent; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality Control Testing: Tests and inspections performed onsite for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector:
 - 1. Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operations, including installation, erection, application, and similar operations:
 - a. Use of trade specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Mockups:
 - 1. Full size physical assemblies that are constructed onsite. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will

be judged:

- a. Laboratory mockups: Full size physical assemblies constructed at testing facility to verify performance characteristics.
 - b. Integrated exterior mockups: Mockups of exterior envelope erected separately from the building but on the Project site, consisting of multiple products, assemblies, and subassemblies.
 - c. Room mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- E. Pre-Construction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- H. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include Contract enforcement activities performed by Architect.
- I. Source Quality Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- J. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- K. IR. Inspector of Record. District to employ or contract with a DSA Certified Inspector of Record for this project.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two (2) or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

- A. Shop Drawings:
1. Submit Plans, Sections, and elevations, indicating materials and size of mockup construction:

- a. Indicate manufacturer and model number of individual components.
 - b. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- B. Contractor's Statement of Responsibility:
1. When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - a. Seismic force resisting system, designated seismic system, or component listed in the designated seismic system quality assurance plan prepared by Architect.
 - b. Main wind force resisting system or wind resisting component listed in the wind force resisting system quality assurance plan prepared by Architect.
- C. Schedule of Tests and Inspections:
1. Prepare in tabular form and include the following:
 - a. Specification Section number and title.
 - b. Entity responsible for performing tests and inspections.
 - c. Description of test and inspection.
 - d. Identification of applicable standards.
 - e. Identification of test and inspection methods.
 - f. Number of tests and inspections required.
 - g. Time schedule or time span for tests and inspections.
 - h. Requirements for obtaining samples.
 - i. Unique characteristics of each quality control service.

1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports:
1. Prepare and submit certified written reports specified. Include the following:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making tests and inspections.
 - f. Description of the Work and test and inspection method.
 - g. Identification of product and Specification Section.
 - h. Complete test or inspection data.
 - i. Test and inspection results and an interpretation of test results.
 - j. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - k. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - l. Name and signature of laboratory inspector.
 - m. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports:
1. Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - a. Name, address, and telephone number of technical representative making report.
 - b. Statement on condition of substrates and their acceptability for installation of product.
 - c. Statement that products at site comply with requirements.
 - d. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - e. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - f. Statement whether conditions, products, and installation will affect warranty.

- g. Other required items indicated in individual Specification Sections.
- C. Factory Authorized Service Representative's Reports:
 - 1. Prepare written information documenting manufacturer's factory authorized service representative's tests and inspections specified in other Sections. Include the following:
 - a. Name, address, and telephone number of factory authorized service representative making report.
 - b. Statement that equipment complies with requirements.
 - c. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - d. Statement whether conditions, products, and installation will affect warranty.
 - e. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- E. Trade Pre-Installation Conferences: Meeting minutes to be Contractor provided.

1.7 QUALITY ASSURANCE

- A. Qualifications establish the minimum qualification levels required; refer to individual Specification Sections for additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated and sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of California and is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated.
- F. Specialists:
 - 1. Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated:
 - a. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Testing Agency Qualifications:
 - 1. A NRTL, a NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, documented according to ASTM E329; with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities:

- a. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - b. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of the manufacturer who is trained and approved by the manufacturer to observe and inspect installation of the manufacturer's products.
- I. Factory Authorized Service Representative Qualifications: An authorized representative of the manufacturer who is trained and approved by the manufacturer to inspect installation of the manufacturer's products.
- J. Pre-Construction Testing:
1. Where testing agency is indicated to perform pre-construction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - a. Contractor responsibilities include the following:
 - 1) Provide test specimens representative of proposed products and construction.
 - 2) Submit specimens with sufficient time for testing and analyzing results to prevent delaying the Work.
 - 3) Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - 4) Build site assembled test assemblies and mockups using installers who will perform same tasks for the Project.
 - 5) Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - 6) When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on the Project.
 2. Testing agency responsibilities: Submit certified written report of each test, inspection, and similar quality assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- K. Mockups:
1. Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - a. Build mockups in location and of size indicated, or if not indicated, as directed by Architect.
 - b. Notify Architect a minimum of seven (7) days in advance of dates and times when mockups will be constructed.
 - c. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction.
 - d. Demonstrate the proposed range of aesthetic effects and workmanship.
 - e. Obtain Architect's approval of mockups before starting Work, fabrication, or construction. Allow seven (7) days for initial review and each re-review of each mockup.
 - f. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - g. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Mockup of the exterior envelope erected separately from the building but on the Project site, consisting of multiple products, assemblies, and subassemblies. Mockup, if not specifically shown on the Drawings, shall be minimum eight

feet by eight feet (8'x8'). Mockup shall include all major façade elements and at least one (1) window a minimum of two feet by two feet (2'x2') in size. Prior to constructing mockup, verify requirements with Architect. Pre-installation conferences for trades involved in integrated exterior mockup shall be held after mockup is completed.

- M. Laboratory Mockups: Comply with requirements of pre-construction testing and those specified in individual Specification Sections.
- N. Trade Pre-Installation Conferences: Meeting minutes to be Contractor provided.

1.8 QUALITY CONTROL

- A. Owner Responsibilities:
 - 1. Where quality control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform the services:
 - a. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - b. Costs for retesting and re-inspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities:
 - 1. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality control activities required to verify that the Work complies with requirements, whether specified or not:
 - a. Unless otherwise indicated, provide quality control services specified and those required by authorities having jurisdiction. Perform quality control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - b. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform the quality control services. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - c. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - d. Where quality control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality control service.
 - e. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - f. Submit additional copies of each written report directly to authorities having jurisdiction when they so direct.
 - g. Provide documentation for construction safety as required by CBC Chapter 33 and CFC Chapter 33. Show representation for construction safeguards through the life of the Project.
- C. Manufacturer's Field Services: Where indicated, engage a factory authorized service representative to inspect field assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00: Submittal Procedures.
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Re-Inspecting: Regardless of whether original tests or inspections were

Contractor's responsibility, provide quality control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

- F. Testing Agency Responsibilities:
1. Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections:
 - a. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - b. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 - c. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
 - d. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
 - e. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - f. Do not perform any duties of Contractor.
- G. Associated Services:
1. Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - a. Access to the Work.
 - b. Incidental labor and facilities necessary to facilitate tests and inspections.
 - c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - d. Facilities for storage and field curing of test samples.
 - e. Delivery of samples to testing agencies.
 - f. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - g. Security and protection for samples and for testing and inspecting equipment at the Project site.
- H. Coordination:
1. Coordinate sequence of activities to accommodate required quality assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting:
 - a. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections:
1. Prepare a schedule of tests, inspections, and similar quality control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses:
 - a. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.9 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections:
1. Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections, as required by authorities having jurisdiction, as the responsibility of Owner, and as indicated in individual Specification Sections:
 - a. Verifying that manufacturer maintains detailed fabrication and quality control

procedures, and reviews the completeness and adequacy of those procedures to perform the Work.

- b. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
- c. Submitting a certified written report of each test, inspection, and similar quality control service to Architect with copy to Contractor and to authorities having jurisdiction.
- d. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
- e. Interpreting tests and inspections and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- f. Retesting and re-inspecting corrected Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log:
 1. Prepare a record of tests and inspections. Include the following:
 - a. Date test or inspection was conducted.
 - b. Description of the Work tested or inspected.
 - c. Date test or inspection results were transmitted to Architect.
 - d. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes:
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 29: Cutting and Patching.
- B. Protect construction exposed by or for quality control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION 01 40 00

SECTION 01 60 00 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products, including but not limited to:
 1. Product delivery, storage, and handling.
 2. Manufacturers' written warranties on products.
 3. Special warranties.
 4. Comparable products.

1.3 DEFINITIONS

- A. Basis of Design Product Specification:
 1. A Specification in which a specific manufacturer's product is named and accompanied by the words *basis of design*, including make, model number, or other designation to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the Specification.
- B. Products:
 1. Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term *product* includes the terms *material*, *equipment*, *system*, *assembly*, and terms of similar intent:
 - a. Named products: Items identified by manufacturer's product name, including make, model number, or other designation shown or listed in manufacturer's published product literature current as of date of the Contract Documents.
 - b. New products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - c. Comparable product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

1.4 SUBMITTALS

- A. Comparable Product Requests:
 1. Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title, and Drawing number(s) and title(s):
 - a. Include data to indicate compliance with the specified requirements.
 - b. Architect's action: If necessary, Architect will request additional information or documentation for evaluation within one (1) week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven (7) days

of receipt of additional information or documentation, whichever is later:

- 1) Form of Approval: As specified in Section 01 33 00: Submittal Procedures.
- 2) Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis of Design Product Specification Submittal:

1. Comply with requirements in Section 01 33 00: Submittal Procedures. Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options:

1. If Contractor is given option of selecting between two (2) or more products for use on Project, select a product compatible with products previously selected, even if previously selected products were also options:
 - a. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - b. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 WARRANTY

A. Warranties specified in other Sections 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:

1. Manufacturer's warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Warranties:

1. Prepare a written document that contains appropriate terms and identification, ready for execution:
 - a. Specified form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - b. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time:

1. Comply with requirements in Section 01 77 00: Closeout Procedures.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original

sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to determine compliance with the Contract Documents, and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

PART 2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. Product Requirements:

1. Provide products that comply with the Contract Documents, are undamaged, and unless otherwise indicated, are new at time of installation:
 - a. Provide products complete with accessories, trim, finish, fasteners, and items needed for complete installation and indicated use and effect.
 - b. Standard products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - c. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - d. Where products are accompanied by the phrase *as selected*, Architect will make selection.
 - e. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

5. Basis of Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and characteristics based on the product named. Comply with requirements for consideration of an unnamed product by one of the named manufacturers.
- C. Visual Matching Specification:
1. Where Specifications require *match Architect's sample*, provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches:
 - a. If no product available within specified category matches and complies with specified requirements, comply with requirements of Section 01 25 00: Substitution Procedures and Form for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase *selected by Architect* or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration:
1. Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 - a. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - b. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - c. Evidence that proposed product provides specified warranty.
 - d. List of similar installations for completed projects with project names and addresses, and names and addresses of architects and owners, if requested.
 - e. Samples, if requested.

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 60 00

SECTION 01 73 00 EXECUTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 1. Construction layout.
 2. Field engineering and surveying.
 3. Installation of the Work.
 4. Coordination of Owner-installed products.
 5. Progress cleaning.
 6. Starting and adjusting.
 7. Protection of installed construction.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor or professional Engineer certifying that location and elevation of improvements comply with requirements.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- C. Certified Surveys: Submit two (2) copies signed by land surveyor.
- D. Final Property Survey: Submit ten (10) copies showing the Work performed and record survey data.

1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor legally qualified to practice in the State of California, who is experienced in providing land surveying services of the kind indicated.
- B. Manufacturer's Installation Instructions: Obtain and maintain onsite manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
- B. In-Place Materials:
 - 1. Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible:
 - a. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Existing Conditions:
 - 1. The existence and location of underground and other utilities and construction indicated as existing are not warranted. Before beginning site Work, investigate and verify existence and location of underground utilities, mechanical and electrical systems, and construction affecting the Work:
 - a. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water service piping, underground electrical services, and other utilities.
 - b. Furnish location data for work related to the Work that must be performed by public utilities serving the site.
- B. Examination and Acceptance of Conditions:
 - 1. Before proceeding with each component of the Work, examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations:
 - a. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - b. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - c. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report:
 - 1. Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
- D. Proceed with installation after correcting unsatisfactory conditions. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field

measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00: Project Management and Coordination.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. Engage a land surveyor or professional Engineer to lay out the Work using accepted surveying practices:
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as necessary to locate each element of Project.
 - 2. Establish limits on use of site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level, and plumb of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two (2) or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points:
 - 1. Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations:
 - a. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or

- control points to Architect before proceeding.
 - b. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks:
- 1. Establish and maintain a minimum of two (2) permanent benchmarks on site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark:
 - a. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - b. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - c. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey:
- 1. Engage a land surveyor or professional Engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional Engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey:
 - a. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - b. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated:
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches (2,440 mm) in occupied spaces and 90 inches (2,300 mm) in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions ensuring the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items onsite and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check shop drawings of other Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment:
 - 1. Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions:
 - a. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - b. Allow for building movement, including thermal expansion and contraction.
 - c. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous. Materials containing asbestos and BCPs are prohibited.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to site for Owner's construction personnel.
- B. Coordination:
 - 1. Coordinate construction and operations of the Work with Work performed by Owner's construction personnel:
 - a. Construction schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - b. Pre-installation conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's Work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. Clean site and Work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully:
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven (7) days during normal weather or three (3) days if the temperature is expected to rise above 80 degrees F (27 degrees C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - 4. Use containers intended for holding waste materials of type to be stored.
 - 5. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

- B. Site: Maintain site free of waste materials and debris.
- C. Work Areas:
 - 1. Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work:
 - a. Remove liquid spills promptly.
 - b. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire Work area, as appropriate.
- D. Installed Work: Keep installed Work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials onsite. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00: Temporary Facilities and Controls.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with mechanical, plumbing, and electrical requirements.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00: Quality Requirements.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 73 29 CUTTING AND PATCHING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes procedural requirements for cutting and patching.

1.3 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other work.

1.4 SUBMITTALS

- A. Cutting and Patching Plan:
 - 1. Submit plan describing procedures at least ten (10) days prior to the time cutting and patching will be performed. Include the following information:
 - a. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - b. Changes to in-place construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - c. Products: List products used for patching and firms or entities that will perform patching work.
 - d. Dates: Indicate when cutting and patching will be performed.
 - e. Utilities and mechanical and electrical systems:
 - 1) List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted:
 - a) Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
- B. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
- C. Operational Elements:
 - 1. Do not cut and patch operating elements and related components that results in

reducing the capacity to perform as intended or that results in increased maintenance or decreased operational life or safety:

- a. Primary operational systems and equipment.
- b. Fire separation assemblies.
- c. Air or smoke barriers.
- d. Fire suppression systems.
- e. Mechanical systems' piping and ducts.
- f. Control systems.
- g. Communication systems.
- h. Fire detection and alarm systems.
- i. Conveying systems.
- j. Electrical wiring systems.
- k. Operating systems of special construction.

D. Miscellaneous Elements:

1. Do not cut and patch the following elements or related components that change the load bearing capacity, resulting in a reduction of capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain wall construction.
 - d. Equipment supports.
 - e. Piping, ductwork, vessels, and equipment.
 - f. Noise and vibration control elements and systems.
 - g. Sprayed fire resistive material.

E. Visual Requirements:

1. Do not cut and patch construction resulting in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner:
 - a. If possible, retain original installer or fabricator to cut and patch exposed Work. If possible, engage original installer or fabricator. If original installer is not available, engage recognized, experienced, and specialized firm for the Work:
 - 1) Processed concrete finishes.
 - 2) Ornamental metal.
 - 3) Matched veneer woodwork.
 - 4) Preformed metal panels.
 - 5) Roofing.
 - 6) Firestopping.
 - 7) Window system.
 - 8) Fluid applied flooring.
 - 9) Wall covering.
 - 10) HVAC enclosures, cabinets, or covers.

- F. Cutting and Patching Conference: Before proceeding, meet at site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Comply with specified requirements.
- B. Existing Materials:
 - 1. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible:
 - a. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed:
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where removal, relocation, or abandonment is necessary, bypass existing services before cutting to avoid interruption of services to occupied areas.

3.3 CUTTING AND PATCHING

- A. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at earliest feasible time, and complete without delay:
 - 1. Cut existing construction to provide for installation of components or performance of construction, and subsequently patch as necessary to restore surfaces to an original condition.
 - 2. Cut in place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of Work to be cut.
- C. Protection: Protect in place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of

free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00: Summary and what is shown on Drawings.

E. Cutting:

1. Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original installer; comply with original installer's written recommendations:
 - a. Use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - b. Finished surfaces: Cut or drill from exposed or finished side into concealed surfaces.
 - c. Concrete and masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - d. Excavating and backfilling: Comply with requirements in applicable earthwork specifications by cutting and patching operations.
 - e. Mechanical and electrical services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - f. Proceed with patching after construction operations requiring cutting are complete.

F. Patching:

1. Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications:
 - a. Inspection:
 - 1) Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - b. Exposed finishes:
 - 1) Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction to eliminate evidence of patching and refinishing:
 - a) Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b) Restore damaged pipe covering to its original condition.
2. Floors and walls: Where walls or partitions are removed, extend one finished area into another, patch and repair surfaces in new space. Provide even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
3. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior building enclosure: Patch components and restore enclosure to a weathertight condition.

END OF SECTION 01 73 29

SECTION 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 1. Salvaging nonhazardous demolition and construction waste.
 2. Recycling nonhazardous demolition and construction waste.
 3. Disposing of nonhazardous demolition and construction waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 SUBMITTALS

- A. Waste Management Plan: Submit plan within ten (10) days of date established for commencement of the Work.
- B. Waste Reduction Progress Reports:
 1. Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste. Include the following information:
 - a. Material category.
 - b. Generation point of waste.
 - c. Total quantity of waste in tons (tonnes).
 - d. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
 - e. Quantity of waste recycled, both estimated and actual in tons (tonnes).
 - f. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
 - g. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total

waste.

- C. Waste Reduction Calculations: Before request for Substantial Completion, submit 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. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.5 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Firm having minimum ten (10) years of documented experience in specializing in waste management coordination.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference:
 - 1. Conduct conference at site. Review methods and procedures related to waste management including, but not limited to, the following:
 - a. Review and discuss waste management plan including responsibilities of waste management coordinator.
 - b. Review requirements for documenting quantities of each type of waste and its disposition.
 - c. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - d. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - e. Review waste management requirements for each trade.

1.6 PERFORMANCE REQUIREMENTS

- A. Conform to County regulations regarding Solid Waste Control.
- B. Achieve end of Project rates for salvage/recycling of 50 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in

the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials:

1. Demolition waste:
 - a. Asphalt paving.
 - b. Concrete.
 - c. Concrete reinforcing steel.
 - d. Brick.
 - e. Concrete masonry units.
 - f. Wood studs.
 - g. Wood joists.
 - h. Plywood and oriented strand board.
 - i. Wood paneling.
 - j. Wood trim.
 - k. Structural and miscellaneous steel.
 - l. Rough hardware.
 - m. Roofing.
 - n. Insulation.
 - o. Doors and frames.
 - p. Door hardware.
 - q. Windows.
 - r. Glazing.
 - s. Metal studs.
 - t. Gypsum board.
 - u. Acoustical tile and panels.
 - v. Carpet.
 - w. Carpet pad.
 - x. Demountable partitions.
 - y. Equipment.
 - z. Cabinets.
 - aa. Plumbing fixtures.
 - bb. Piping.
 - cc. Supports and hangers.
 - dd. Valves.
 - ee. Sprinklers.
 - ff. Mechanical equipment.
 - gg. Refrigerants.
 - hh. Electrical conduit.
 - ii. Copper wiring.
 - jj. Lighting fixtures.
 - kk. Lamps.
 - ll. Ballasts.
 - mm. Electrical devices.
 - nn. Switchgear and panelboards.
 - oo. Transformers.
2. Construction waste:
 - a. Masonry and CMU.
 - b. Lumber.
 - c. Wood sheet materials.
 - d. Wood trim.
 - e. Metals.
 - f. Roofing.
 - g. Insulation.
 - h. Carpet and pad.
 - i. Gypsum board.
 - j. Piping.

- k. Electrical conduit.
- l. Packaging - Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.7 WASTE MANAGEMENT PLAN

- A. Develop a waste management plan and requirements. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition site clearing and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan:
 - 1. List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste and Form CWM-4 for demolition waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures:
 - a. 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.
 - b. Salvaged materials for sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - c. Salvaged materials for donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - d. Recycled materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - e. Disposed materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - f. Handling and transportation procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.
- D. Cost/Revenue Analysis:
 - 1. Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use Form CWM-5 for construction waste and Form CWM-6 for demolition waste. Include the following:
 - a. Total quantity of waste.
 - b. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 - c. Total cost of disposal (with no waste management).
 - d. Revenue from salvaged materials.

- e. Revenue from recycled materials.
- f. Savings in hauling and tipping fees by donating materials.
- g. Savings in hauling and tipping fees that are avoided.
- h. Handling and transportation costs. Include cost of collection containers for each type of waste.
- i. Net additional cost or net savings from waste management plan.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

- A. 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 operation, termination, and removal requirements in Section 01 50 00: Temporary Facilities and Controls.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training:
 - 1. Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work:
 - a. Distribute waste management plan to everyone concerned within three (3) days of submittal return.
 - b. Distribute waste management plan to entities when they first begin work onsite. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls:
 - 1. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities:
 - a. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - b. Comply with Section 01 50 00: Temporary Facilities and Controls for the control of dust and dirt, environmental protection, and noise control.
- E. Waste Management in Historic Zones or Areas: Hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by 12 inches (300 mm) or more.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work:
 - 1. Salvage items for reuse and handle:
 - a. Clean salvaged items.
 - b. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - c. Store items in a secure area until installation.
 - d. Protect items from damage during transport and storage.
 - e. Install salvaged items to comply with installation requirements for new materials

and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for Owner's Use:
 - 1. Salvage items for Owner's use and handle as follows:
 - a. Clean salvaged items.
 - b. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - c. Store items in a secure area until delivery to Owner.
 - d. Transport items to Owner's storage area designated by Owner.
 - e. Protect items from damage during transport and storage.
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors, unless otherwise designated by Owner.
- E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- F. Plumbing Fixtures: Separate by type and size.
- G. Lighting Fixtures: Separate lamps by type and protect from breakage.
- H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING WASTE

- A. Recycle paper and beverage containers used by onsite workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures:
 - 1. Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan:
 - a. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin:
 - 1) Inspect containers and bins for contamination and remove contaminated materials if found.
 - b. Stockpile processed materials onsite without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - c. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - d. Store components off the ground and protect from the weather.
 - e. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 DISPOSAL OF WASTE

- A. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose 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 to accumulate onsite.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning:
 - 1. Do not burn waste materials:
 - a. Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.
- C. Disposal: Remove waste materials and dispose of at designated spoil areas on Owner's property.

3.5 ATTACHMENTS

- A. Form CWM-1 for construction waste identification.
- B. Form CWM-2 for demolition waste identification.
- C. Form CWM-3 for construction waste reduction work plan.
- D. Form CWM-4 for demolition waste reduction work plan.
- E. Form CWM-5 cost/revenue analysis of construction waste reduction work plan.
- F. Form CWM-6 cost/revenue analysis of demolition waste reduction work plan.
- G. Form CWM-7 for construction waste
- H. Form CWM-8 for demolition waste.

CWM FORMS ON FOLLOWING PAGES

FORM CWM-1: CONSTRUCTION WASTE IDENTIFICATION							
MATERIAL CATEGORY	GENERATION POINT	EST. QUANTITY OF MATERIALS RECEIVED* (A)	EST. WASTE - % (B)	TOTAL EST. QUANTITY OF WASTE* (C = A x B)	EST. VOLUME CY (CM)	EST. WEIGHT TONS (TONNES)	REMARKS AND ASSUMPTIONS
Packaging: Cardboard							
Packaging: Boxes							
Packaging: Plastic Sheet or Film							
Packaging: Polystyrene							
Packaging: Pallets or Skids							
Packaging: Crates							
Packaging: Paint Cans							
Packaging: Plastic Pails							
Site-Clearing Waste							
Masonry or CMU							
Lumber: Cut-Offs							
Lumber: Warped Pieces							
Plywood or OSB (scraps)							
Wood Forms							
Wood Waste Chutes							
Wood Trim (cut-offs)							
Metals							
Insulation							
Roofing							
Joint Sealant Tubes							
Gypsum Board (scraps)							
Carpet and Pad (scraps)							
Piping							
Electrical Conduit							
Other:							

FORM CWM-2: DEMOLITION WASTE IDENTIFICATION				
MATERIAL DESCRIPTION	EST. QUANTITY	EST. VOLUME CY (CM)	EST. WEIGHT TONS (TONNES)	REMARKS AND ASSUMPTIONS
Asphaltic Concrete Paving				
Concrete				
Brick				
CMU				
Lumber				
Plywood and OSB				
Wood Paneling				
Wood Trim				
Miscellaneous Metals				
Structural Steel				
Rough Hardware				
Insulation				
Roofing				
Doors and Frames				
Door Hardware				
Windows				
Glazing				
Acoustical Tile				
Carpet				
Carpet Pad				
Demountable Partitions				
Equipment				
Cabinets				
Plumbing Fixtures				
Piping				
Piping Supports and Hangers				
Valves				
Sprinklers				
Mechanical Equipment				
Electrical Conduit				
Copper Wiring				
Light Fixtures				
Lamps				
Lighting Ballasts				
Electrical Devices				
Switchgear and Panelboards				
Transformers				
Other:				

FORM CWM-3: CONSTRUCTION WASTE REDUCTION WORK PLAN						
MATERIAL CATEGORY	GENERATION POINT	TOTAL EST. QUANTITY OF WASTE TONS (TONNES)	DISPOSAL METHOD AND QUANTITY			HANDLING AND TRANSPORTION PROCEDURES
			EST. AMOUNT SALVAGED TONS (TONNES)	EST. AMOUNT RECYCLED TONS (TONNES)	EST. AMOUNT DISPOSED TO LANDFILL TONS (TONNES)	
Packaging: Cardboard						
Packaging: Boxes						
Packaging: Plastic Sheet or Film						
Packaging: Polystyrene						
Packaging: Pallets or Skids						
Packaging: Crates						
Packaging: Paint Cans						
Packaging: Plastic Pails						
Site-Clearing Waste						
Masonry or CMU						
Lumber: Cut-Offs						
Lumber: Warped Pieces						
Plywood or OSB (scraps)						
Wood Forms						
Wood Waste Chutes						
Wood Trim (cut-offs)						
Metals						
Insulation						
Roofing						
Joint Sealant Tubes						
Gypsum Board (scraps)						
Carpet and Pad (scraps)						
Piping						
Electrical Conduit						
Other:						

FORM CWM-4: DEMOLITION WASTE REDUCTION WORK PLAN						
MATERIAL CATEGORY	GENERATION POINT	TOTAL EST. QUANTITY OF WASTE TONS (TONNES)	DISPOSAL METHOD AND QUANTITY			HANDLING AND TRANSPORTION PROCEDURES
			EST. AMOUNT SALVAGED TONS (TONNES)	EST. AMOUNT RECYCLED TONS (TONNES)	EST. AMOUNT DISPOSED TO LANDFILL TONS (TONNES)	
Asphaltic Concrete Paving						
Concrete						
Brick						
CMU						
Lumber						
Plywood and OSB						
Wood Paneling						
Wood Trim						
Miscellaneous Metals						
Structural Steel						
Rough Hardware						
Insulation						
Roofing						
Doors and Frames						
Door Hardware						
Windows						
Glazing						
Acoustical Tile						
Carpet						
Carpet Pad						
Demountable Partitions						
Equipment						
Cabinets						
Plumbing Fixtures						
Piping						
Supports and Hangers						
Valves						
Sprinklers						
Mechanical Equipment						
Electrical Conduit						
Copper Wiring						
Light Fixtures						
Lamps						
Lighting Ballasts						
Electrical Devices						
Switchgear and Panelboards						
Transformers						
Other:						

FORM CWM-5: COST/REVENUE ANALYSIS OF CONSTRUCTION WASTE REDUCTION WORK PLAN								
MATERIALS	TOTAL QUANTITY OF MATERIALS (VOL. OR WEIGHT) (A)	EST. COST OF DISPOSAL (B)	TOTAL EST. COST OF DISPOSAL (C = A x B)	REVENUE FROM SALVAGED MATERIALS (D)	REVENUE FROM RECYCLED MATERIALS (E)	LANDFILL TIPPING FEES AVOIDED (F)	HANDLING AND TRANSPORTATION COSTS AVOIDED (G)	NET COST SAVINGS OF WORK PLAN (H = D+E+F+G)
Packaging: Cardboard								
Packaging: Boxes								
Packaging: Plastic Sheet or Film								
Packaging: Polystyrene								
Packaging: Pallets or Skids								
Packaging: Crates								
Packaging: Paint Cans								
Packaging: Plastic Pails								
Site-Clearing Waste								
Masonry or CMU								
Lumber: Cut-Offs								
Lumber: Warped Pieces								
Plywood or OSB (scraps)								
Wood Forms								
Wood Waste Chutes								
Wood Trim (cut-offs)								
Metals								
Insulation								
Roofing								
Joint Sealant Tubes								
Gypsum Board (scraps)								
Carpet and Pad (scraps)								
Piping								
Electrical Conduit								
Other:								

FORM CWM-6: COST/REVENUE ANALYSIS OF DEMOLITION WASTE REDUCTION WORK PLAN								
MATERIALS	TOTAL QUANTITY OF MATERIALS (VOL. OR WEIGHT) (A)	EST. COST OF DISPOSAL (B)	TOTAL EST. COST OF DISPOSAL (C = A x B)	REVENUE FROM SALVAGED MATERIALS (D)	REVENUE FROM RECYCLED MATERIALS (E)	LANDFILL TIPPING FEES AVOIDED (F)	HANDLING AND TRANSPORTATION COSTS AVOIDED (G)	NET COST SAVINGS OF WORK PLAN (H = D+E+F+G)
Asphaltic Concrete Paving								
Concrete								
Brick								
CMU								
Lumber								
Plywood and OSB								
Wood Paneling								
Wood Trim								
Miscellaneous Metals								
Structural Steel								
Rough Hardware								
Insulation								
Roofing								
Doors and Frames								
Door Hardware								
Windows								
Glazing								
Acoustical Tile								
Carpet								
Carpet Pad								
Demountable Partitions								
Equipment								
Cabinets								
Plumbing Fixtures								
Piping								
Supports and Hangers								
Valves								
Sprinklers								
Mech. Equipment								
Electrical Conduit								
Copper Wiring								
Light Fixtures								
Lamps								
Lighting Ballasts								
Electrical Devices								
Switchgear and Panelboards								
Transformers								
Other:								

FORM CWM-7: CONSTRUCTION WASTE REDUCTION PROGRESS REPORT								
MATERIAL CATEGORY	GENERATION POINT	TOTAL QUANTITY OF WASTE TONS (TONNES) (A)	QUANTITY OF WASTE SALVAGED		QUANTITY OF WASTE RECYCLED		TOTAL QUANTITY OF WASTE RECOVERED TONS (TONNES) (D = B + C)	TOTAL QUANTITY OF WASTE RECOVERED % (D / A x 100)
			ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (B)	ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (C)		
Packaging: Cardboard								
Packaging: Boxes								
Packaging: Plastic Sheet or Film								
Packaging: Polystyrene								
Packaging: Pallets or Skids								
Packaging: Crates								
Packaging: Paint Cans								
Packaging: Plastic Pails								
Site-Clearing Waste								
Masonry or CMU								
Lumber: Cut-Offs								
Lumber: Warped Pieces								
Plywood or OSB (scraps)								
Wood Forms								
Wood Waste Chutes								
Wood Trim (cut-offs)								
Metals								
Insulation								
Roofing								
Joint Sealant Tubes								
Gypsum Board (scraps)								
Carpet and Pad (scraps)								
Piping								
Electrical Conduit								
Other:								

FORM CWM-8: DEMOLITION WASTE REDUCTION PROGRESS REPORT								
MATERIAL CATEGORY	GENERATION POINT	TOTAL QUANTITY OF WASTE TONS (TONNES) (A)	QUANTITY OF WASTE SALVAGED		QUANTITY OF WASTE RECYCLED		TOTAL QUANTITY OF WASTE RECOVERED TONS (TONNES) (D = B + C)	TOTAL QUANTITY OF WASTE RECOVERED % (D / A x 100)
			ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (B)	ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (C)		
Asphaltic Concrete Paving								
Concrete								
Brick								
CMU								
Lumber								
Plywood and OSB								
Wood Paneling								
Wood Trim								
Miscellaneous Metals								
Structural Steel								
Rough Hardware								
Insulation								
Roofing								
Doors and Frames								
Door Hardware								
Windows								
Glazing								
Acoustical Tile								
Carpet								
Carpet Pad								
Demountable Partitions								
Equipment								
Cabinets								
Plumbing Fixtures								
Piping								
Supports and Hangers								
Valves								
Sprinklers								
Mechanical Equipment								
Electrical Conduit								
Copper Wiring								
Light Fixtures								
Lamps								
Lighting Ballasts								
Electrical Devices								
Switchgear and Panelboards								
Transformers								
Other:								

END OF SECTION 01 74 19

SECTION 01 77 00 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 PRE-CLOSEOUT MEETING

- A. Pre-Closeout Meeting: Schedule and convene a pre-closeout meeting with Owner and Architect in accordance with Section 01 31 00: Project Management and Coordination.

1.3 SUBSTANTIAL COMPLETION

- A. The items identified in the Contract Documents, including the Supplementary Conditions and the following items shall be completed before Substantial Completion will be granted (also see Section 01 77 22: Substantial Completion Procedures):
 1. Contractor's completion list (punch list): Submit a thorough list of items to be completed or corrected, along with a written request for Substantial Completion and for review of the Work or portion of the Work. Architect's or Engineer's Project representative, at their discretion, may attend and assist in the preparation of Contractor's punch list.
 2. Architect's supplemental punch list: Architect/Engineer, along with Owner at Owner's discretion, will inspect the Work utilizing Contractor's prepared punch list, noting completed items and incomplete items, and will prepare a supplemental list of items that have been omitted or incomplete items that were not previously noted.
 3. Operations and maintenance manuals: Submit as described.
 4. Final cleaning: Provide final cleaning and adequate protection of installed construction as described.
 5. Starting of systems: Start up equipment and systems as described.
 6. Testing and balancing: Testing and balancing of systems must be performed and completed by Owner's forces, and the report submitted and accepted by Architect/Engineer and Owner, as described in the Contract Documents. Make adjustments to equipment as required to achieve acceptance.
 7. Demonstrations: If required by individual Specification Sections or by Owner, provide demonstrations and instructions for use of equipment as described.
- B. Date of Substantial Completion: Complete or correct items identified on punch list and confirm that all items have been corrected prior to Architect's re-inspection. Architect/Engineer, along with Owner, will re-inspect the corrected work to establish the Date of Substantial Completion. Incomplete items remaining will be appended to the Certificate of Substantial Completion (AIA G704). The Date of Substantial Completion represents day one of the closeout period and represents the date of commencement of Contractor's correctional period and all warranty periods as described and required by the Contract Documents, except as amended in the Certificate of Substantial Completion and elsewhere in the Contract Documents.
- C. Certificate of Substantial Completion: When the Work or designated portion thereof is substantially complete, Architect will prepare the Certificate of Substantial Completion to be executed by Owner and Contractor. Items on the appended punch list shall be completed or corrected within the time limits established in the Certificate.

1.4 PUNCH LIST

- A. A comprehensive list prepared by Contractor prior to Substantial Completion, and attached thereto, to establish all items to be corrected, or limited items of work to be completed, if any. This list is intended to represent a limited number of items needing attention.
- B. Punch lists shall be furnished to Architect in Microsoft Excel and PDF formats. The punch list shall be in matrix form and shall include the following information for each punch list item:
 - 1. Room number or other suitable location identifier.
 - 2. Description of the Work.
 - 3. Subcontractor/trade sign-off that the work has been verified to be 100 percent complete and in accordance with the Contract Documents.
 - 4. Subcontractor/trade sign-off date.
 - 5. General Contractor sign-off that the work has been verified to be 100 percent complete and in accordance with the Contract Documents.
 - 6. General Contractor/trade sign-off date.
 - 7. A/E consultant sign-off.
 - 8. A/E consultant sign-off date.
 - 9. If requested by Owner, provide two (2) additional similar columns for their sign-off.
 - 10. In the case of excessive repetition of the same item at various locations, the punch list may contain "general notes/items" that shall be applied to the entire Project. It shall be the responsibility of the Contractor/Subcontractor to thoroughly examine the entire Project and make corrective measures at all applicable locations.
- C. Should Architect determine that Contractor's punch list lacks sufficient detail or requires extensive supplementation, the punch list will be returned to Contractor for re-inspection and revision. The date of Substantial Completion will be delayed until the punch list submitted is a reasonable representation of the Work to be done.
- D. A significantly large number of items to be completed or corrected will preclude Architect from issuing a Certificate of Substantial Completion. Owner and Architect will be the sole judges of what constitutes a significantly large number of items. It is anticipated that the detailed list of items of Work to be completed or corrected at the Date of Substantial Completion will be no longer than five (5) typed pages.
- E. Contractor's superintendent shall participate in the preparation of Contractor's punch list that is submitted to Architect and Owner for supplementation. Upon receipt, Architect and consultants shall perform a spot review to determine the adequacy and completeness of Contractor's punch list.
- F. Upon receipt of an acceptable Contractor's punch list, Contractor's superintendent shall accompany Architect, his consultants and Owner (at his discretion) during their observation and the preparation of their supplements to Contractor's punch list:
 - 1. The superintendent shall record or otherwise take note of all supplementary items.
 - 2. Architect will endeavor to furnish to Contractor typed, hand written, or recorded supplements to the punch list in a prompt manner; however, any delay in Contractor receiving said supplements from Architect will not be cause for a claim for additional cost or extension of time as Contractor's superintendent shall have been in attendance during the inspections of Architect and his consultants and will have been expected to take his own notes.

1.5 OPERATIONS AND MAINTENANCE MANUAL

- A. As a requirement for Substantial Completion, the final operation and maintenance manual shall be submitted to, and reviewed and accepted by Architect prior to issuance of the

Certificate.

- B. Prepare a 3-ring D-slant binder cover and spline with printed title "OPERATIONS AND MAINTENANCE MANUAL," title of Project, and subject matter of binder when multiple binders are required.
- C. Submit one (1) copy of preliminary operations and maintenance manuals to respective consultants (civil, MEP, structural, etc.) for review of conformance with Contract requirements prior to submitting final to Architect. Allow time for proper review.
- D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- F. Contents:
 - 1. Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - a. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, subcontractors, and major equipment suppliers.
 - b. Part 2: Operation and Maintenance, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:
 - 1) Significant design criteria.
 - 2) List of equipment.
 - 3) Parts list for each component.
 - 4) Equipment start-up instructions
 - 5) Operating instructions.
 - 6) Maintenance instructions for equipment and systems.
 - 7) Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - c. Part 3: Project documents and certificates, including the following:
 - 1) Product data.
 - 2) Air and water balance reports.
 - 3) Photocopies of warranties, certificates and bonds. Submit originals with Closeout Documents as specified below.
- G. Submit one (1) final original and two (2) copies to Architect.
- H. Contractor shall provide a DVD, in PDF Format, the following documents after approval by Architect, consultants, and Owner: Closeout Manual, MSDS binder, O&M Manuals, Specifications and approved submittals. Documents shall be hyperlinked to the Table of Contents.

1.6 PROJECT CLOSEOUT

- A. Final Payment will not be authorized by Architect until Architect finds the Work acceptable under the Contract Documents, subject to the completion and acceptance of the following requirements and other applicable Contract requirements:
 - 1. Close-out Documents: Provide bound closeout documents as described. Refer to the Supplementary Conditions for additional information.
 - 2. Record Documents: Submit as described.
 - 3. Extra materials: Provide extra stock, materials, and products as described when

- required by individual Specification Sections.
4. Locks: Make final changeover of permanent locks and transmit keys to Owner. Advise Owner's personnel of changeover in security provisions.
 5. Temporary Facilities: Discontinue and remove temporary facilities from the site, along with mockups, construction aids, and similar elements.
 6. Warranties, Certificates and Bonds: Execute and assemble transferable warranty documents, certificates, and bonds from subcontractors, suppliers, and manufacturers as described.
 7. Final Inspection and Acceptance by Architect is achieved as described.

1.7 CLOSEOUT DOCUMENTS

- A. Coordinate the following items with the requirements of Document CB, Supplementary Conditions of the Contract.
- B. Prepare 3-ring D-slant binder cover and spine with printed title "CLOSEOUT DOCUMENTS", title of Project, and subject matter of binder when multiple binders are required. Submit one (1) original and two (2) copies.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. The closeout documents shall be neatly organized and easily useable as determined by Architect and Owner. Separate closeout document binders from operations and maintenance manuals. Documents identified as "affidavit" shall be notarized.
- E. Prepare a table of contents for each volume, with each item description identified, typed on white paper, in five (5) parts as follows:
 1. Part 1: Directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, subcontractors, and major equipment suppliers. All General Contractor's vendors/suppliers and subcontractors that provided materials or performed any work related to this Project must be listed on this form. Submit final list of subcontractors on Document AD.
 2. Part 2: Closeout documents and affidavits, including the following:
 - a. AIA G707 - Consent of Surety to Final Payment.
 - b. AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
 - c. AIA G706A - Contractor's Affidavit of Release of Liens.
 3. Part 3: Project documents and certificates, including the following:
 - a. Copy of Certificate of Substantial Completion (AIA G704).
 - b. Copy of All Permits.
 - c. Copy of Final Utility Bill or letter of transfer.
 - d. Copy of Certificate of Occupancy.
 - e. Copy of Certification of Project Compliance: Submit on attached **Closeout Form "B"**. Owner and Architect will initiate form and forward to Contractor for signature once Substantial Completion is established (Owner to be provided original separately).
 4. Part 4: Warranties and Release of Liens; compile sequentially based on Specification Sections:
 - a. General Contractor's warranty: Submit on company letterhead as described below. This Warranty shall state all sections of Work performed by General Contractor's own forces, and warranty period for each section of Work.
 - b. Subcontractor's release of lien: Include Contractor's, Subcontractor's, and direct material and equipment supplier's separate final releases. Submit on attached **Closeout Form "A"** – Subcontractor's Affidavit of Release of Lien.
 - c. Hazardous material certificate: Submit on attached **Closeout Form "C"**. Affidavits from Contractor, subcontractors and General Contractor's vendors or suppliers

- stating that no hazardous materials/products have been used or installed in this Project.
- d. Subcontractor's warranty: Notarized and submitted on attached **Closeout Form "D"**. This warranty shall state all sections of Work performed by the Subcontractor and warranty period.
 - e. Special/extended warranties: List and provide notarized warranties requested by Owner, or required by or incorporated in the Contract Documents.
 - f. Spreadsheet depicting all items and materials that carry a warranty longer than one (1) year. Include information consisting of material/supplier/installer/Specification Section/length of warranty and contact information.
5. Part 5: Receipts:
- a. Extra stock: Provide original receipts for delivery of "extra stock" items as described below. Receipts must be signed by an authorized Owner's representative.
 - b. Keys: Provide original receipts for delivery of "keys." Receipts must be signed by an authorized Owner's representative.
 - c. Sign-in sheets: Provide signatures of attendees from all demonstrations.
- F. In addition to the three (3) required closeout binders listed above, provide Architect with one (1) separate binder for their records containing the following:
- 1. Directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, subcontractors, and major equipment suppliers.
 - 2. All MSDS sheets for the Project.
 - 3. All warranties from Contractor, subcontractors, direct suppliers, and manufacturers.
- G. Failure to complete and closeout Project after substantial completion may result in liquidated damages being assessed to Contractor. Refer to Conditions of the Contract for additional requirements and liquidated damages.

1.8 FINAL CLEANING

- A. Execute final cleaning prior to final Project inspection and acceptance.
- B. Clean interior and exterior glass, and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces, mop hard floor surfaces.
- C. Remove smudges, marks, stains, fingerprints, soil, dirt, spots, dust, lint, and other foreign materials from finished and exposed surfaces
- D. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- E. Clean and replace filters of operating equipment as required by Contract Documents
- F. Clean debris from roofs, gutters, downspouts, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste and surplus materials, rubbish, and temporary construction facilities from site.

1.9 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual

Specification Sections until Work is accepted by Architect and Owner.

- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.10 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer and Owner 48 hours prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of Contractors' personnel, and installer in accordance with manufacturers' instructions.
- G. When specified in individual Specification Sections or required by manufacturer, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. When specified in individual Specification Sections or required by Owner or Architect/Engineer, submit a written report in accordance with Section 01 33 00, Submittal Procedures, that equipment or system has been properly installed and is functioning correctly.

1.11 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel a minimum of 48 hours prior to date of Final Completion in accordance with Owner's requirements.
- B. Demonstrate Project equipment instructed by qualified manufacturer's representative who is knowledgeable about the Project and equipment.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six (6) months.
- D. Utilize maintenance manual as basis for instruction. Review contents of manual with

Owner's personnel to explain all aspects of operation and maintenance.

- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment.
- F. Prepare and insert additional data in maintenance manuals when needed for when additional data becomes apparent during instruction.
- G. Review and verify proper start-up and operation of equipment prior to scheduling demonstrations with Owner.
- H. All demonstrations are to be documented by video and submitted to Owner in DVD format along with the closeout documents. General Contractor is responsible for all video and compilation onto DVD with linked menus.

1.12 PROJECT RECORD DOCUMENTS

- A. Project Record Documents, as described in Section 01 78 39: Project Record Documents, shall be submitted at Project closeout. Final payment will not be authorized by Architect until final review and acceptance by Architect and Engineers is achieved in accordance with Owner's requirements.
- B. At Contractor's request, and with associated fee, Architect may provide electronic versions of the construction Drawing and Specification files for Contractor's use, subject to the terms and conditions of Architect's standard electronic document transfer agreement.
- C. Submit reproducible to respective consultants (civil, structural, MEP, etc.) for review. Consultant will mark-up corrections and return to Contractor for final revisions. Make final revisions prior to submitting to Architect:
 - 1. Format: One (1) set of film positive reproducible and two (2) sets of blueprints of approved reproducible.
 - 2. Provide Owner with one (1) set of Record Drawings on a non-rewritable CD in AutoCAD® latest release.
 - 3. Provide Owner with one (1) set of Record Drawings on a non-rewritable CD in PDF format.
 - 4. Label electronic CAD files and PDF files in the same manner as the sheets (example, A2.02 First Floor Area 'A', etc.)

1.13 EXTRA STOCK, MATERIALS, AND MAINTENANCE PRODUCTS

- A. Furnish extra stock, maintenance, and extra products in quantities specified in individual Specification Sections.
- B. Deliver to Project site or to District Maintenance Department as directed by Owner; obtain signed receipt from Owner's authorized representative prior to final application for payment. Delivery of materials to, or obtaining receipt from anyone other than Owner's authorized representative may constitute breach of this requirement and may require delivery of additional materials at no cost to Owner if original materials are misplaced.
- C. Include signed receipts for delivery of extra stock and materials, including keys, with closeout documents.

1.14 WARRANTIES, CERTIFICATES, AND BONDS

- A. Definitions:

1. Standard product warranties: Preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to Owner.
 2. Special warranties: Written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide coverage of specific defects, or both.
- B. In accordance with the general warranty obligations under the General Conditions as amended by the Supplementary Conditions, General Contractor's warranty shall be for a period of one (1) year following the date of Substantial Completion, hereinafter called the one-year warranty period. Contractor's one (1) year general warranty shall include all labor, material, and delivery costs required to correct defective material and installation. This warranty shall not limit Owner's rights with respect to latent defects, gross mistakes, or fraud.
- C. Contractor's one (1) year warranty shall run concurrently with the one (1) year period for correction of Work required in the General Conditions.
- D. No service charges or call out charges are allowed to investigate warranty claims.
- E. In addition to Contractor's one (1) year warranty, special warranties, as described in individual Specifications Sections, shall extend the warranty period for the period specified without limitation in respect to other obligations for which Contractor has under the Contract Documents.
- F. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of the warranty on the Work that incorporates the products, nor does it relieve the suppliers, manufacturers, and subcontractors required to countersign special warranties with Contractor.
- G. Warranty Requirements:
1. When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
 2. When Work covered by a warranty has failed and been corrected by replacement or reconstruction, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
 3. Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. Contractor is responsible for the cost of replacing defective Work regardless of whether Owner has benefited from use of the Work through a portion of its anticipated useful service life.
 4. Written warranties made to Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights, and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which Owner can enforce such other duties, obligations, rights, or remedies.
 5. Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or designated portion of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.
- H. Compile copies of each required warranty properly executed by Contractor and the Subcontractor, supplier, or manufacturer. Verify documents are in proper form, contain full information, and are notarized. Co-execute warranties, certificates, and bonds when required and include signed warrantees with Closeout Documents submitted to Architect.

1.15 FINAL COMPLETION AND FINAL PAYMENT

- A. Final Notice and Inspection:
 - 1. When all items on the punch list have been corrected, final cleaning has been completed, and installed work has been protected, submit written notice to Architect that the Work is ready for final inspection and acceptance.
 - 2. Upon receipt of written notice that the Work is ready for final inspection and acceptance, Architect and Engineer will make final inspection.
- B. Final Change Order: When the Project closeout items described above are successfully completed and the Work is found acceptable to Architect/Engineer and Owner, a Final Change Order will be executed. This Change Order will include any Allowance adjustments as required by the Contract Documents.
- C. Final Application for Payment: When all of the above items are successfully complete, submit to Architect a final Application for Payment and request for release of retainage.
- D. Release of Retainage: Release of retainage will not be authorized by Architect until Contractor completes all requirements for closeout to the satisfaction of Owner and Architect as described herein.

1.16 TERMINAL INSPECTION

- A. Immediately prior to expiration of the one (1) year period for correction of the Work, Contractor shall make an inspection of the Work in the company of Architect and Owner. Architect and Owner shall be given not less than ten (10) days' notice prior to the anticipated date of terminal inspection.
- B. Where any portion of the work has proven to be defective and requires replacement, repair, or adjustment, Contractor shall immediately provide materials and labor necessary to remedy such defective work and shall execute such work without delay until completed to the satisfaction of Architect and Owner, even if the date of completion of the corrective work may extend beyond the expiration date of the correction period.
- C. Contractor shall not be responsible for correction of Work that has been damaged because of neglect or abuse by Owner, nor the replacement of parts necessitated by normal wear in use.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 77 00

CLOSE-OUT FORM "A"

SUBCONTRACTOR'S AFFIDAVIT OF RELEASE OF LIEN

STATE OF CALIFORNIA

COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS:

_____, being first duly sworn, deposes and says:

1. That he / she is the _____ of _____, the subcontractor who supplied, installed, and /or erected the Work described below, and that, he /she is duly authorized to make this Affidavit and Subcontractor Release:

Project: Coastside Fire Station 40 Kitchen Remodel

Owner: Coastside Fire Protection District Architect: PBK

Work Performed: _____ Specification Section(s): _____

2. That all Work required under the subject subcontractor of the subject construction project has been performed in accordance with the terms thereof, that all material men, sub-subcontractors, mechanics, and laborers have been paid and satisfied in full and that there are no outstanding claims of any character arising out of the performance of said subcontractor which have not been paid and satisfied in full.
3. That to the best of his / her knowledge and belief, there are no unsatisfied claims for damages resulting from injury or death to any employees, sub-subcontractors, or the public at large arising out of the performance of said subcontract, or any suits or claims for any other damages of any kind, nature, or description which might constitute a lien upon the property of the Owner.
4. That he / she has received full payment of all sums due him / her for materials furnished and services rendered by the undersigned in connection with the performance of said subcontract and has and does hereby release the Owner and the Architect and his consultants and the Contractor from any and all claims of any character arising out of or in any way connected with performance of said subcontract.

ATTEST (If Corporation)

Name of Subcontractor

Secretary

(By) (Title)

STATE OF _____

COUNTY OF _____

Sworn to and subscribed before me on this _____ day of _____, 20_____.

(Seal)

(Notary Public Signature)

SECTION 01 78 23 OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 1. Operation and maintenance documentation directory manuals.
 2. Emergency manuals.
 3. Systems and equipment operation manuals.
 4. Systems and equipment maintenance manuals.
 5. Product maintenance manuals.

1.3 DEFINITIONS

- A. Subsystem: A portion of a system with characteristics similar to a system.
- B. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

1.4 SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section:
 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format:
 1. Submit operation and maintenance manuals in the following format:
 - a. Submit on digital media acceptable to Architect or by uploading to web-based project software site or by email to Architect. Enable reviewer comments on draft submittals.
 - b. Submit three (3) paper copies. Architect will return two (2) copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal:
 1. Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments:
 - a. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of

receipt of Architect's comments and prior to commencing demonstration and training.

- E. Comply with Section 01 77 00: Closeout Procedures for schedule for submitting operation and maintenance documentation. Where applicable use 01 91 13: General Commissioning Requirements.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files:
 - 1. Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required:
 - a. Electronic files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - b. File names and bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Manuals, Paper Copy:
 - 1. Submit manuals in the form of hard-copy, bound and labeled volumes:
 - a. Binders:
 - 1) Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 by 11-inch (215 mm X 280 mm) paper, with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets:
 - a) If two (2) or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b) Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 - b. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project manual.
 - c. Protective plastic sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
 - d. Supplementary text: Prepared on 8-1/2 by 11-inch (215 mm X 280 mm) white bond paper.
 - e. Drawings:
 - 1) Attach reinforced, punched binder tabs on Drawings and bind with text:
 - a) If oversize Drawings are necessary, fold Drawings to same size as text pages and use as foldouts.
 - b) If Drawings are too large to be used as foldouts, fold and place Drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating Drawing titles, descriptions of contents, and Drawing locations.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals:
 - 1. Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - a. Title page.
 - b. Table of contents.
 - c. Manual contents.
- B. Title Page:
 - 1. Include the following information:
 - a. Subject matter included in manual.
 - b. Name and address of Project.
 - c. Name and address of Owner.
 - d. Date of submittal.
 - e. Name and contact information for Contractor.
 - f. Name and contact information for Construction Manager.
 - g. Name and contact information for Architect.
 - h. Name and contact information for commissioning authority.
 - i. Names and contact information for major consultants to Architect that designed the systems contained in the manuals.
 - j. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents:
 - 1. List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual:
 - a. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory:
 - 1. Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
 - a. List of systems and subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 - b. List of equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
 - c. Tables of contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content:
 - 1. Organize manual into a separate section for each of the following:
 - a. Type of emergency.
 - b. Emergency instructions.
 - c. Emergency procedures.
- C. Type of Emergency:
 - 1. Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - a. Fire.
 - b. Flood.
 - c. Gas leak.
 - d. Water leak.
 - e. Power failure.
 - f. Water outage.
 - g. System, subsystem, or equipment failure.
 - h. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures:
 - 1. Include the following, as applicable:
 - a. Instructions on stopping.
 - b. Shutdown instructions for each type of emergency.
 - c. Operating instructions for conditions outside normal operating limits.
 - d. Required sequences for electric or electronic systems.
 - e. Special operating instructions and procedures.

1.9 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual:
 - 1. Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures:
 - a. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - b. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content:
 - 1. In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - a. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 - b. Performance and design criteria if Contractor has delegated design responsibility.
 - c. Operating standards.

- d. Operating procedures.
 - e. Operating logs.
 - f. Wiring diagrams.
 - g. Control diagrams.
 - h. Piped system diagrams.
 - i. Precautions against improper use.
 - j. License requirements including inspection and renewal dates.
- C. Descriptions:
- 1. Include the following:
 - a. Product name and model number. Use designations for products indicated on Contract Documents.
 - b. Manufacturer's name.
 - c. Equipment identification with serial number of each component.
 - d. Equipment function.
 - e. Operating characteristics.
 - f. Limiting conditions.
 - g. Performance curves.
 - h. Engineering data and tests.
 - i. Complete nomenclature and number of replacement parts.
- D. Operating Procedures:
- 1. Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Instructions on stopping.
 - f. Normal shutdown instructions.
 - g. Seasonal and weekend operating instructions.
 - h. Required sequences for electric or electronic systems.
 - i. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed and identify color coding where required for identification.

1.10 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals:
- 1. Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information:
 - a. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - b. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project manual and Drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation:
 - 1. Include the following information for each component part or piece of equipment:
 - a. Standard maintenance instructions and bulletins:
 - 1) Include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one (1) item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable:
 - a) Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 - b. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - c. Identification and nomenclature of parts and components.
 - d. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures:
 - 1. Include the following information and items that detail essential maintenance procedures:
 - a. Test and inspection instructions.
 - b. Troubleshooting guide.
 - c. Precautions against improper maintenance.
 - d. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - e. Aligning, adjusting, and checking instructions.
 - f. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules:
 - 1. Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment:
 - a. Scheduled maintenance and service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - b. Maintenance and service record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds:
 - 1. Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds:
 - a. Include procedures to follow and required notifications for warranty claims.
- J. Drawings:
 - 1. Prepare Drawings supplementing manufacturers' printed data to illustrate the

relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these Drawings with information contained in record Drawings to ensure correct illustration of completed installation:

- a. Do not use original Project record documents as part of maintenance manuals.

1.11 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project manual and Drawing or schedule designation or identifier where applicable.
- D. Product Information:
 1. Include the following, as applicable:
 - a. Product name and model number.
 - b. Manufacturer's name.
 - c. Color, pattern, and texture.
 - d. Material and chemical composition.
 - e. Reordering information for specially manufactured products.
- E. Maintenance Procedures:
 1. Include manufacturer's written recommendations and the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Schedule for routine cleaning and maintenance.
 - e. Schedule for annual inspection and reports.
 - f. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds:
 1. Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds:
 - a. Include procedures to follow and required notifications for warranty claims.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 78 23

SECTION 01 78 39 PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project record documents, including but not limited to:
 1. Record Drawings.
 2. Record Specifications.
 3. Record Product data.
 4. Miscellaneous record submittals.

1.3 SUBMITTALS

- A. Record Drawings:
 1. Number of copies - Submit one (1) set of marked up record prints.
 2. Number of Copies - Submit copies of record Drawings:
 - a. Initial submittal:
 - 1) Submit PDF electronic files of scanned record prints and one (1) of file prints.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final submittal:
 - 1) Submit PDF electronic files of scanned record prints and three (3) sets of prints.
 - 2) Submit record digital data files and three (3) sets of record digital data file plots.
 - 3) Plot each Drawing file, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit one (1) paper copy and one (1) annotated PDF electronic files of the Project Specifications, including addenda and Contract modifications.
- C. Record Product Data:
 1. Submit one (1) paper copy and one (1) annotated PDF electronic file and directories of each submittal:
 - a. Where record product data are required as part of operation and maintenance manuals, submit duplicate marked up product data as a component of manual.

1.4 PROJECT RECORD DOCUMENT PROCEDURES

- A. Do not use Project record documents for construction purposes. Protect Project record documents from deterioration and loss. Provide access to Project record documents for Architect's reference:
 1. **Do not use** as-built Drawings and Specifications for record Drawings and Specifications.
- B. Recording Procedures: Update Drawings and Specifications on daily bases to record actual conditions. Record information concurrently with construction progress. Do not conceal work

until required information is accurately recorded.

- C. Store record documents and samples apart from as-built documents used for construction:
 - 1. Label and file record documents and samples in accordance with Section number listings in table of contents. Label each document **PROJECT RECORD** in neat, large, printed letters.
 - 2. Maintain record documents in clean, dry, and legible condition.
 - 3. Make record documents and samples available for inspection upon request of Architect.

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints:
 - 1. Maintain one (1) set of marked up paper copies of the Contract Drawings and shop drawings:
 - a. Preparation:
 - 1) Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, Subcontractor, or similar entity, to provide information for preparation of corresponding marked up record prints. Show actual installation conditions where installation varies from that shown originally:
 - a) Give attention to information on concealed elements difficult to identify or measure and record later.
 - b) Accurately record information in an acceptable drawing technique.
 - c) Record data as soon as possible after obtaining it.
 - d) Record and check the markup before enclosing concealed installations.
 - e) Cross reference record prints to corresponding shop drawings or archive photographic documentation.
 - 2. Content:
 - a. Types of items requiring marking include, but are not limited to, the following:
 - 1) Dimensional changes to Drawings.
 - 2) Revisions to details shown on Drawings.
 - 3) Depths of foundations below first floor.
 - 4) Locations and depths of underground utilities.
 - 5) Revisions to routing of piping and conduits.
 - 6) Revisions to electrical circuitry.
 - 7) Actual equipment locations.
 - 8) Duct size and routing.
 - 9) Locations of concealed internal utilities.
 - 10) Changes made by Change Order or Construction Change Directive.
 - 11) Changes made following Architect's written orders.
 - 12) Details not on the original Contract Drawings.
 - 13) Field records for variable and concealed conditions.
 - 14) Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and shop drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked up record prints.
 - 4. Mark record sets with erasable, red colored pencil. Use colors to distinguish between changes for different categories of the work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order

numbers, and similar identification, where applicable.

- B. Record Digital Data Files:
1. Immediately before inspection for Certificate of Substantial Completion, review marked up record prints with Architect. When authorized, prepare full set of corrected digital data files of the Contract Drawings:
 - a. Format: Same digital data software program, version, and operating system as the original Contract Drawings and annotated PDF electronic file with comment function enabled.
 - b. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 - c. Refer instances of uncertainty to Architect for resolution.
 - d. Architect will furnish Contractor one (1) set of digital data files of the Contract Drawings for use in recording information:
 - 1) Refer to Section 01 33 00: Submittal Procedures for requirements related to use of Architect's digital data files.
 - 2) Architect will provide data file layer information. Record markups in separate layers.
- C. Newly Prepared Record Drawings:
1. Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor shop drawings are suitable to show actual installation:
 - a. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or modification. Including ALL documents used for Construction Change Directive to DSA.
 - b. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format:
1. Identify and date each record Drawing; include the designation **PROJECT RECORD DRAWING** in a prominent location:
 - a. Record prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - b. Format: Annotated PDF electronic file with comment function enabled.
 - c. Record digital data files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - d. Identification:
 - 1) As follows:
 - a) Project name.
 - b) Date.
 - c) Designation PROJECT RECORD DRAWINGS.
 - d) Name of Architect.
 - e) Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation:
1. Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and Contract modifications:
 - a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

- b. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - c. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
 - d. For each principal product, indicate whether record product data has been submitted in operation and maintenance manuals instead of submitted as record product data.
 - e. Note related Change Orders, record product data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file and marked up paper copy of Specifications. ALL documents to match PBK format.

2.3 RECORD PRODUCT DATA

- A. Preparation:
- 1. Mark product data to indicate the actual product installation where installation varies substantially from that indicated in product data submittal:
 - a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - b. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - c. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record product data as annotated PDF electronic file. Include record product data directory organized by Specification Section number and title, electronically linked to each item of record product data.

2.4 RECORD SAMPLES

- A. Record Samples: Determine with Architect and Owner which submitted samples are to be maintained as record samples. Maintain and mark one (1) set to indicate date of review and approval by Architect; note any deviations or variations between reviewed sample and installed product or material.

2.5 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by the individual Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference. Include the following:
- 1. Reviewed shop drawings, product data, and samples.
 - 2. Field test reports.
 - 3. Inspection certificates and manufacturer's certificates.
 - 4. Inspections by authorities having jurisdiction (AHJ [DSA]).
 - 5. Documentation of foundation depths.
 - 6. Special measurements or adjustments.
 - 7. Tests and inspections.
 - 8. Surveys.
 - 9. Design mixes.
 - 10. DSA submitted CCDs.
- B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked up miscellaneous record submittals. Include miscellaneous record submittals

directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one (1) copy of each submittal during the construction period for Project record document purposes. Post changes and revisions to Project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and samples in the field office apart from the Contract Documents used for construction. Do not use Project record documents for construction. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project record documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 02 41 00 DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Furnishing all labor, materials, and equipment necessary for demolition, dismantling, cutting, and alterations as indicated, specified, and required for completion of the Contract, as applicable. Includes items such as the following:
 - a. Protecting existing work to remain.
 - b. Hazardous material identification and removal.
 - c. Utility service and termination.
 - d. Removing debris and equipment.
 - e. Removal of items indicated on Drawings.
 - f. Disposal of material.
- B. Related Sections:
 - 1. Section 01 74 19: Construction Waste Management and Disposal.
- C. Regulatory Requirements:
 - 1. Conform to applicable jurisdictional authority regulations and codes for disposal of debris.
 - 2. Coordinate clearing work with utility companies.
 - 3. Maintain emergency access ways at all times.
 - 4. Contractor shall comply with all applicable laws and ordinances regarding hazardous materials, including contaminated soils, hazardous material transformers, and similar materials or components.

1.3 SUBMITTALS:

- A. Schedule: Submit a detailed sequence of demolition and removal work, including dates for shutoff, capping, and continuance of utility services.
- B. Procedures: Submit written procedures documenting the proposed methods to be used to control dust and noise.

1.4 EXISTING 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.
- B. Conduct demolition to minimize interference with adjacent structures or items to remain. Maintain protected egress and access at all times.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXISTING 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.
- B. Conduct demolition to minimize interference with adjacent structures or items to remain. Maintain protected egress and access at all times.

3.2 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, Contractor shall be solely and completely responsible for working conditions at the jobsite, 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. Safety precautions prevent damage to existing elements identified to remain or to be salvaged and prevent injury to the public and workmen engaged onsite. Demolish roofs, walls, and other building elements in such a manner that demolished materials fall within foundation lines of building. Do not allow demolition debris to accumulate onsite. Pull down hazardous work at end of each day; do not leave standing or hanging overnight, or over weekends:
 - 1. Protect existing items that are not indicated to be altered. Protect utilities designated to remain from damage.
 - 2. Protect bench marks from damage or displacement.
- D. Fire Safety: Contractor shall conform to Chapter 33 of the California Fire Code (CFC), "Fire Safety During Construction and Demolition," at all times during the construction process. A copy of this chapter can be provided.

3.3 EXAMINATION

- A. Examine conditions of work in place before beginning Work; report defects.
- B. Report existence of hazardous materials or unsafe structural conditions.

3.4 PREPARATION

- A. Scheduling:
 - 1. General: Coordinate and schedule demolition work as required by Owner and as necessary to facilitate construction progress.
- B. Hazardous Materials:
 - 1. General: Identify chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations, and notify such jurisdictional agencies as may be required. Collect and legally dispose of such materials at official

- disposal locations away from the site.
2. Asbestos: If asbestos or materials containing asbestos are encountered, stop work immediately and contact Owner. Do not proceed with demolition until directed by Owner.
- C. Utility and Service Termination:
1. Locate and identify existing utility, service components affected by Work of this Contract. Review existing record Drawings, conduct site investigations, contact Underground Service Alert and other qualified cable/pipe/line locator services, and implement all other means necessary to define the location of underground systems.
 2. Prior to beginning any demolition, properly disconnect all water, gas, and electrical power supply at appropriate disconnect locations. Obtain all necessary releases and approvals from serving utility companies.
 3. Prior to demolition or disconnect, obtain Owner's approval that such system does not impact facilities or systems beyond the extent of this Contract.
 4. Mark location of disconnected systems. Identify and indicate stub-out locations on Project record documents.
- D. Coordinate the time and duration of all system disconnects with Owner.

3.5 DEMOLITION

- A. General Requirements:
1. Coordinate with Owner the time of day and route to remove demolished materials from premises.
 2. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.
- B. Fixture and Equipment Removal:
1. Remove existing fixtures and equipment as identified and shown on Drawings and required by Architect.
 2. Verify all service connections to fixtures and equipment designated for removal have been properly disconnected.
 3. Remove all conductors from conduit at all abandoned circuits.

3.6 UTILITY AND BUILDING SERVICES REMOVAL AND RE-INSTALLATION

- A. Where crossing paths and potential points of interference with existing utility services are shown or can be reasonably inferred from surface conditions or evidence of subsurface systems, such as meter boxes, vaults, relief vents, cleanouts, and similar components:
1. Review all Contract Documents showing crossing paths and potential points of interference.
 2. Pot-hole or determine by other means the accurate depth and location of such utilities.
 3. Incorporate all costs required to complete work under this Contract, including additional trenching, re-routing of existing and new utilities, and all means necessary to construct work under this Contract.
 4. No additional cost to Owner will be allowed for work necessary to accommodate utility conflicts where such crossing paths are shown on Contract Drawings or can be reasonably inferred from surface conditions or components.
- B. Remove all conductors from conduit at all abandoned electrical circuits.
- C. Seal off ends of all piping, drains, and other components as directed by Architect and serving utility.

- D. Where necessary to maintain service to existing utility and building systems, relocate or redirect all conduit and conductors, piping, drains, and associated system components:
 - 1. Re-circuit all electrical as required.
 - 2. Re-circuit all landscape irrigation valving and control systems as required.
 - 3. Temporarily terminate landscape system components in approved boxes or with approved caps, suitable for re-connection or extension.
 - 4. Extend or otherwise modify all site drainage systems, including catch basins, drain inlets, and piping. Fine grade to maintain proper drainage flow pattern to drains.
- E. Demolish structure in an orderly and careful manner:
 - 1. Use of explosives prohibited.

3.7 DISPOSAL

- A. Demolished materials become property of the Contractor and shall be removed from premises, except those items specifically listed to be retained by Owner.
- B. Dispose of all demolished material, trash, debris, and other materials not used in the work in accordance with the regulations of jurisdictional authority.
- C. It is required that all materials that are of a recyclable nature, be transported to a suitable legal recycling facility instead of a dump or refuse facility (unless they are one-in-the same).
- D. Burning and Burying of Materials: **Not allowed.**
- E. Haul Routes:
 - 1. Obtain permits as required by jurisdictional agencies. Establish haul routes in advance; post flagmen for the safety of the public and workmen.
 - 2. Keep streets free of mud, rubbish, etc. Assume responsibility for damage resulting from hauling operations; hold Owner free of liability in connection therewith.
- F. Remove demolished materials and debris from site on a daily basis.

3.8 CLEANING

- A. Upon completion of work of this Section, promptly remove from the working area all scraps and debris.
- B. Clean excess material from the surface of all remaining paved surfaces and utility structures.
- C. Power wash all concrete surfaces to remove stains, dried mud, tire marks, and rust spots.

END OF SECTION 02 41 00

SECTION 02 41 19 SELECTIVE DEMOLITION

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 site demolition, removal and disposal.
 - 1. This section includes, but is not necessarily limited to the demolition, removal and disposal of buildings, paving, utilities, septic tanks and disposal field, and water well, as shown on the Civil drawing series of the construction documents.
- B. Related Work Described Elsewhere
 - 1. Division 22 & 23: Plumbing and Mechanical
 - 2. Division 26: Electrical
 - 3. California Fire Code.

1.3 SUBMITTALS

- A. Submit record documents under General Provisions.

1.4 EXISTING CONDITIONS

- A. Conduct demolition to minimize interference with adjacent structures and property.
- B. Provide, erect, and maintain temporary barriers and security devices.
- C. Conduct operations with minimum interference to public or private thoroughfares. Maintain protected egress and access at all times.
- D. Do not close or obstruct roadways and sidewalks without permits.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide materials, not specifically described but required for proper completion of the work of this Section, as selected by the Contractor, subject to the approval of the Engineer.

PART 3 EXECUTION

3.1 PREPARATION

- A. Prevent movement or settlement of remaining structure. Provide bracing and shoring as required. Contractor shall be responsible for design of all shoring and bracing.
- B. Contact all necessary utility companies for removal after transfer of existing utility lines within demolition areas. Demolition and removal by contractor.
- C. Mark location of re-routed utilities. Identify utilities and indicate capping locations on project record documents.

3.2 EXECUTION

- A. Verify location of all utilities prior to demolition. Ensure the existing utilities to remain are protected from damage during demolition.
- B. Cease operations and notify Architect immediately if remaining structure appears to be endangered. Do not resume operations until corrective measures have been taken.
- C. Except where noted otherwise, immediately remove demolished material from site.
- D. Relics, antiques, and similar objects remain the property of the District. Notify Architect prior to removal, and obtain acceptance regarding method of removal. Relics and antiques may include:
 - 1. Cornerstones and commemorative plaques.
 - 2. Historical remains or artifacts.
- E. Remove and properly dispose of contaminated, vermin infested, or dangerous materials encountered.
- F. Do not burn or bury materials on site.
- G. Remove demolished materials from site as work progresses. Leave site in clean condition.
- H. All materials removed from site shall be disposed of according to all federal, state, and local requirements.
- I. Remove and properly dispose of septic waste, contaminated soil, or dangerous materials encountered. Abandon tank in manner approved by County Health Department.

END OF SECTION 02 41 19

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings and foundation walls.
 - 2. Interior slabs-on-grade.
 - 3. Exterior slabs-on-grade.
- B. Special Coordination Requirements: Coordinate with the work of the following Sections to identify the finish flooring manufacturer's concrete slab requirements. Such requirements may be over and above the requirements of the Contract Documents and may require additional materials, means, or methods, which shall be included as part of the Work.
- C. Related Sections:
 - 1. Division 22: Plumbing.
 - 2. Division 23: Mechanical.
 - 3. 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: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- 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 2025 California Building Code (CBC) (CCR Title 24, Part 2, as adopted and amended by DSA).
 - b. American Concrete Institute (ACI) Publications:
 - 1) Comply with the following unless modified by requirements in the Contract Documents:
 - a) ACI 301, "Specifications for Structural Concrete."
 - b) ACI 117, "Specification for Tolerances for Concrete Construction and Materials and Commentary."
 - c) ACI 302.1R, "Guide to Concrete Floor and Slab Construction."
 - d) ACI 302.2R, "Guide for Concrete Slabs that receive Moisture-Sensitive Flooring Materials."
 - e) ACI 305R, "Guide to Hot Weather Concreting."
 - f) ACI 306R, "Guide to Cold Weather Concreting."
 - g) ACI 318, "Building Code Requirements for Structural Concrete and Commentary."
 2. Floor leveling to be FF50 (Minimum FF35, approval by Architect) and tested per ASTM E1155 following ACI 117 using 3D laser imaging to meet requirement unless otherwise noted on Drawings.

- 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.

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:
 - 1) High-density overlay, Class 1 or better.
 - 2) Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - 3) Structural 1, B-B or better; mill oiled and edge sealed.
 - 4) 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 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. 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.
- F. 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. Reinforcing Bars: ASTM A615/A615M, Grade 60.
- B. Welded Reinforcing Bars: Low-alloy-steel reinforcing bars, ASTM A706/A706M, deformed.
- C. Do not use reinforcement having any of the following defects:
 - 1. Bar lengths, depths, or bends exceeding the specified fabricating tolerances.

2. Bends or kinks not indicated on the Drawings or required for this Work.
3. Bars with cross-section reduced due to excessive rust or other causes.

2.3 REINFORCEMENT ACCESSORIES

- A. Bar Supports:
1. Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 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 I/II. Supplement with the following:
 - 1) 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.

2.5 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:
 - 1) Water/cement ratio: Maximum 0.52.
 - 2) Water vapor transmission: Less than 0.1 perms (5.7 g/Pa-s-m²).

- 3) Water seepage or permeability: Not to exceed 7.00×10^{-9} cm/s @ 50psi (2.3 x 10-10 ft/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."

2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder:
 1. ASTM E1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape:
 - a. Products are subject to compliance with requirements. Acceptable products:
 - 1) Stego Industries, LLC: Stego Wrap 15 mil Class A.
 - 2) Grace Construction Products: Florprufe 120.
 - 3) W. R. Meadows, Inc.: Perminator 15 mil.
 - 4) Substitutions with Architect's approval, and pursuant to conditions of Divisions 00 and 01.
- B. 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.

2.7 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.

2.8 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.

2.9 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.

2.10 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. Slump limit: Four inches (4"), plus or minus one inch (1").

2.11 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 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.

2.13 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment:
 - 1. Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces:
 - a. Basis-of-design product: Subject to compliance with requirements, provide Moxie International Inc.; **Moxie Shield 1500 Concrete Sealer or Moxie Shield MFSII Flooring Sealer**, P.O. Box 838 Loomis, CA 95650; Contact Manufacturer's representative: P:916-251-0825, F: 877-330-1930 Email: info@moxieshield.com.
 - b. 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."

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. Construct forms tight enough to prevent loss of concrete mortar.
- D. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

- E. 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. Lap joints six inches (6") and seal with manufacturer's recommended tape.
 - b. Seal all penetrations (including pipes) per manufacturer's tape.
 - c. No penetration of the vapor barrier is allowed except for reinforcing and permanent utilities.
 - d. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged

- area six inches (6") and taping all four sides with tape.
- e. Do not saturate the sand cushion.
- f. If sand is saturated prior to placement of concrete, remove the sand and replace.
- g. Protect all installed moisture barrier construction from precipitation and water penetration by covering and providing positive drainage away from the moisture barrier.
- h. 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.

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 restraightening 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. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. 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:
 - 1) 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:
 - a) 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:
 - 1) ASTM C31/C31M:
 - a) Cast and laboratory cure two (2) sets of two (2) standard cylinder specimens for each composite sample.
 - b) Cast and field cure two (2) sets of two (2) standard cylinder specimens for each composite sample.
 - h. Compressive-strength tests:
 - 1) 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:
 - a) 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.
 - b) 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 03 30 00

SECTION 06 10 00 ROUGH CARPENTRY

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 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 wood framed structures including but not limited to flooring, wall, roof and ceiling construction.
 - 2. Backing/blocking for millwork and casework items that are an integral part of wall, floor, and/or ceiling construction.
 - 3. Backing/Blocking for Mechanical-Plumbing-Electrical work and equipment.
 - 4. Plywood sheathing.
- B. Related Sections:
 - 1. Section 03 30 00: Cast-In-Place Concrete.
 - 2. Section 07 92 00: Joint Sealants.
 - 3. Section 09 21 16: Gypsum Board Assemblies.
- C. Reference Standards:
 - 1. 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 that is contrary to code requirements:
 - a. Standard Grading and Dressing Rule #16, of the West Coast Lumber Inspection Bureau.
 - b. Grading Rules for Western Lumber of the Western Wood Products Association.
 - c. Standard Specifications for Grades of California Redwood Lumber of the Redwood Inspection Service.
 - d. American Wood Preservers Association (AWPA) Standard C 2-77 Lumber, Timbers, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.
 - e. American Wood Preservers Bureau (AWPB) Quality Control Standards.

1.3 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.

1.4 DELIVERY, STORAGE, AND HANDLING

- 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:
 - 1. Douglas fir or larch, graded and grade-marked, according to Reference Standard 1.02 A or B, #1 grade:
 - a. Boards: Construction grade.
- C. Sill Plates (On Concrete): Construction grade light framing, pressure treated as hereinafter specified; as noted on Plans.
- D. Rough Hardware:
 - 1. 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 that are in contact with wood pressure treated with waterborne salts:
 - a. Bolts and nuts: ASTM A307, Grade A.
 - b. Lag bolts: Fed. Spec. FF-B-561. Pre-drill per CBC.
 - c. Nails: Fed. Spec. FF-N-101, common unless otherwise noted or specified.
 - d. Joist hangers and framing connectors: Simpson or approved equal, unless otherwise noted.
 - e. Power driven fasteners: Hilti, Ramset, or approved equal, each use and fastener type subject to prior approval of Architect.
- E. Pressure Treatment (Decay and Termite Prevention):
 - 1. Pressure treat for decay and termite prevention, Douglas fir or larch wood materials that are embedded in or set against concrete.
 - 2. Treat in accordance with Reference Standard 1.02 E and quality mark as per Reference Standard 1.02 F.
 - 3. Treat with any of the following processes at Contractor option. Creosote type preservatives are not permitted:
 - a. Penta in an LPG carrier (Cellon) or Penta in Hydrocarbon Solvent-Type D (Dow Process) AWPB LP-4 quality marked.
 - b. Ammoniacal copper arsenate (ACA) or chromated copper arsenate (CCA) in a water carrier (AWPB LP-2 quality marked).
 - c. Disodium Octaborate Tetrahydrate (DOT) such as Advance Guard/Hi-bor by Osmose, Inc.
 - d. Members treated with waterborne salts shall be dried to a moisture content not exceeding 19 percent 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.
- F. Framing Connectors: Simpson Strong Tie Corp., or equal.

2.2 MOISTURE CONTENT

- A. 19 percent maximum for two times thickness and less; 19 percent maximum for thickness greater than two times and less than four times; and 22 percent maximum for thickness greater than four times.

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 re-sawn surfaces of clean natural color unless noted or specified otherwise. Concealed framing lumber shall be S4S.

PART 3 EXECUTION

3.1 ERECTION AND INSTALLATION

- 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 2022 California Building Code (CBC).
- C. Bridging and Blocking: Conform to CBC. Provide two times 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 06 10 00

SECTION 06 20 00 FINISH CARPENTRY AND MILLWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Providing all finish carpentry items including, but not limited to:
 - a. Finish carpentry.
 - b. Millwork and cabinetry.
 - c. Wood veneer facing.
 - d. Granite countertop.
 - e. Casework hardware.
 - f. Miscellaneous millwork.
 - 2. Installation of:
 - a. Finish hardware.
- B. Related Sections:
 - 1. Section 06 10 00: Rough Carpentry.
 - 2. Section 09 21 16: Gypsum Board Assemblies.
- C. Reference Standards:
 - 1. Codes and references:
 - a. 2025 California Building Code Section 11B-309.
 - b. American Disabilities Act Design Guidelines (ADADG).
 - 2. American National Standards Institute:
 - a. ANSI A156.9 Cabinet Hardware.
 - b. ANSI A161.1 Woodwork Testing Standards.
 - c. ANSI A208.1 Mat-Formed Wood Particleboard.
 - 3. Woodwork Institute:
 - a. WI North American Architectural Woodwork Standards (current edition).
 - 4. National Electrical Manufacturers Association:
 - a. NEMA LD 3 High Pressure Decorative Laminates.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's specifications and other data needed to prove compliance with specified requirements.
 - 2. Manufacturer's preprinted product information for all hardware proposed on the Project.
 - 3. Manufacturer's preprinted maintenance instructions for the casework hardware.
- B. Shop Drawings:
 - 1. Indicate size, material, and finish.
 - 2. Show locations and installation procedures, including hardware, sinks, service fixtures, trim, and other pertinent data for each unit.
- C. Certification: Provide manufacturer's certification that casework has been fabricated and

installed according to WI "Custom" Grade guidelines or better.

- D. Samples: Two (2) each, six-inch by six-inch by $\frac{3}{4}$ -inch (6" x 6" x $\frac{3}{4}$ ") sample of specified particleboard core with grade stamp for use as verification of installed product.
- E. Closeout:
 - 1. Record drawings: Indicate revisions to original Drawings and shop drawings.
 - 2. Manufacturer contact names, addresses, and phone numbers.
 - 3. Finish material schedule: Names and color numbers of laminates and stains.
 - 4. Keys: Provide additional master key for each room and additional locksets totaling one percent (1%) of total Project for attic stock.

1.4 PERFORMANCE REQUIREMENTS

- A. Unless otherwise indicated, perform work in accordance with WI "Architectural Woodwork Standards," Custom Grade, except where specification exceeds those standards the more stringent shall govern.
- B. Fabricate millwork and cabinetry in accordance with ANSI A161.1, NEMA LD3, and general static load testing performed and certified by an independent testing agency covering the following areas of product performance, with these minimum results:
 - 1. Base cabinet construction/racking test: 800 pounds.
 - 2. Cabinet front joint loading test: 425 pounds.
 - 3. Wall cabinet static load test: 2,000 pounds.
 - 4. Drawer front joint loading test: 600 pounds.
 - 5. Drawer construction/static load test: 750pounds.
 - 6. Cabinet adjustable shelf support device/static load test: 300 pounds.
- C. Shelf Loading: Comply with loading/deflection standards of the Composite Panel Association.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a licensee of WI's Certified Compliance Program.
- B. Installer Qualifications: Licensee of WI's Certified Compliance Program.
- C. Quality Standard:
 - 1. Unless otherwise indicated, comply with WI's "Manual of Millwork" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements:
 - a. Before delivery to jobsite, millwork supplier:
 - 1) Licensees of WI shall issue a certified compliance certificate indicating millwork products being furnished for this Project, and certifying that these products and their installation, will fully meet requirements of grade or grades specified.
 - 2) Non-licensees of WI shall provide evidence that they have arranged for inspection by WI inspector after completion of fabrication and installation. If conditions are found to be compliant, inspector will issue Compliance Certificate indicating millwork products being furnished for this Project and certifying that these products and their installation will fully meet requirements of grade or grades specified.
 - b. Each elevation of casework and each countertop shall bear certified compliance

- label.
- c. Cabinet Design Series (CDS): CDS numbers on Drawings indicate typical designs.
- D. Certified Seismic Installation Program (CSIP):
 - 1. Before wood or metal stud walls are closed up, provide a written Woodwork Institute CSIP report confirming that acceptable backing is provided in all locations required for casework installation or identifying those locations where backing is missing or improperly located:
 - a. Backing shall consist of a minimum of either three by six (3 x 6) flat Douglas Fir or 16-gage 50 KSI sheet metal.
 - 2. On completion of installation, provide a Woodwork Institute CSIP Certificate identifying the work covered and certifying that installation meets the requirements of the WI CSIP attachment details and schedules.
 - 3. All fees charged by the Woodwork Institute for their CSIP are the responsibility of the millwork installer and shall be included in their bid.
- E. Pre-Installation Conference:
 - 1. See Section 01 31 00: Project Management and Coordination.

1.6 WARRANTY

- A. Warranty the work specified herein for five (5) years against becoming unserviceable or causing an objectionable appearance resulting from either defective or nonconforming materials and workmanship.
- B. Defects shall include but not be limited to the following:
 - 1. Rough or difficult operation, or loose or missing parts.
 - 2. Delamination of surfaces.
 - 3. Noticeable deterioration of finish.
 - 4. Warped or misaligned surfaces or telegraphing of subsurface imperfections.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver completed laminate clad casework, countertops, and related products only after wet operations in building are completed. Store in ventilated place, protected from the weather, with relative humidity range of 20 to 50 percent.
- B. Protect finished surfaces from soiling and damage during handling and installation with a protective covering.

PART 2 PRODUCTS

2.1 MILLWORK MANUFACTURERS

- A. Woodwork Institute listed Accredited Millwork Companies, current roster and shall not preclude Contractor from using other manufacturers, provided they produce equivalent products of the type specified for the scope and size of the Project. Other manufacturers must have experience manufacturing products meeting or exceeding the specifications and must comply with the criteria performance set by the Woodwork Institute or as indicated in Part 1 of this Section and with Division 01 requirements regarding substitutions.

2.2 MILLWORK MATERIALS

- A. Wood Veneer Facing:

1. Decorative Wood Veneer:
Hardwood veneer facing complying with HPVA HP-1, and the following requirements:
Provide rift cut white oak or other species as scheduled. Direction of grain shall be vertical on doors, end panels, fascia panels, and exposed backs; horizontal on drawer faces, aprons, and top rails.
 2. Veneer Grades:
 - a. Exposed doors, finished end panels, and other exposed vertical surfaces: HPVA Grade A veneer faces.
 - b. Semi-exposed surfaces: HPVA Grade B veneer faces.
 - c. Cabinet liner: Thermally fused melamine panel, white.
 - d. Backsplashes: Veneer faced panel to match cabinet exterior where indicated.
 3. Veneer Matching:
 - a. Veneer leaves within panels: Book matched
 - b. Adjacent panels. Slip matched and sequence matched where possible.
 - c. Veneer from the same flitch for adjacent cabinet runs where possible.Adhesive:
Type II PVA water-resistant adhesive complying with HPVA HP-1. Contact adhesives not permitted.
 4. Interior Cabinet Surfaces:
 - a. Thermally fused melamine complying with NEMA LD3 VGL or CLS, white.
 - b. Closed interiors and underside of wall cabinets: White.
 - c. Exposed and semi-exposed open cabinets: Match exterior finish.
 - d. Unsurfaced coreboard or simple backers not permitted.
 5. Finish:
Factory applied transparent finish complying with AWI/AWMAC/WI Architectural Woodwork Standards for Premium Grade. Provide stain color as selected by Architect.
- B. Core Material:
1. Particleboard: ANSI 208.1, Grade M-2-Exterior Glue.
 2. Medium-density fiberboard: ANSI A208.2, Grade MD.
 3. Plywood: Shop sanded, exterior grade veneer cored, hardwood faced, any species, with no defects affecting strength or utility. Overlay plywood not permitted. Plywood allowed at countertops and toe-base only.
 4. Water resistant treated plywood shall have 24-hour thickness swell factor of five percent (5%) or less and 24-hour water absorption factor of ten percent (10%) or less; P.S. 51, Type II or better.
 5. Cabinet components shall be of the following minimum core thicknesses:
 - a. Cabinet backs, drawer body, and drawer bottoms: ½-inch particleboard.
 - b. Door and drawer face, base, wall, and tall cabinet tops and bottoms, cabinet sides, drawer spreaders, cabinet back rear hangstrips, structural dividers, and exposed cabinet backs: ¾-inch particleboard.
 - c. Work surfaces and countertops: Minimum one-inch (1") particleboard or plywood, except use water resistant treated plywood core at counters with sinks.
 - d. Shelves: ¾-inch particleboard core for 30 inches long or less, one-inch (1") thick particleboard core for more than 30 inches long; 14-inch deep, unless otherwise noted. Provide vertical dividers for shelves over 36 inches long.
 - e. Cabinet toe-base: ¾-inch plywood. No particleboard within four inches (4") of floor.
- C. Countertops - WI Premium Grade: Where indicated on Drawings.
1. Granite countertops:
 - a. Seams:
 - 1) Fabricate countertops to minimize the number of seams to the greatest extent practicable. Where seams are required, fabricate countertops in sections indicated for field assembly. Provide tight-fitting joints filled with

- color-matched epoxy or polyester resin adhesive. Finished seams shall be uniform and not exceed 1/16 inch (1.5 mm) in width.
- b. Fittings: Drill and cut countertops in shop for sinks, faucets, anchors, and other required fittings. Coordinate locations and sizes with approved shop drawings and equipment templates.
 - c. Backsplashes: Provide 4-inch (4") high granite backsplashes where indicated. Fabricate from material matching countertop. Ease exposed edges and polish to match countertop finish.
 - d. Surface Finish and Repair: After fabrication and installation, remove minor surface marks or scratches by honing and polishing using progressively finer abrasives to restore the factory finish. Finished surfaces shall be uniform in appearance and free of chips, cracks, or visible fabrication defects.
2. Fabrication:
 - a. Fabricate tops in one piece, unless otherwise indicated. Comply with solid surfacing material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing:
 - 1) Fabricate tops with shop applied edges of materials and configuration indicated.
 - 2) Fabricate tops with loose backsplashes for field application.
 - b. Drill holes in countertops for plumbing fittings and soap dispensers in shop.
 3. Countertop construction tolerances:
 - a. Variation from plumb: For vertical lines and surfaces, do not exceed 1/16 inch in 48 inches (1.5 mm in 1,200 mm).
 - b. Variation from level: Do not exceed 1/8 inch in 96 inches (3 mm in 2,400 mm), 1/4-inch (6 mm) maximum.
 - c. Variation in joint width: Do not vary joint thickness more than 1/4 of nominal joint width.
 - d. Variation in plane at joints (lipping): Do not exceed 1/64-inch (0.4 mm) difference between planes of adjacent units.
 - e. Variation in line of edge at joints (lipping): Do not exceed 1/64-inch (0.4-mm) difference between edges of adjacent units, where edge line continues across joint.
- D. Countertops and Backsplashes:
1. Countertops: Where indicated on Drawings; provide countertops with rolled edges in as long as practical continuous lengths. Provide field glued splines at joints. No joints closer than 24 inches either side of sink cutout.
 2. Backsplash: Integral to countertop, four inches (4") high unless otherwise shown. Fabricate with single continuous sheet of laminate from front counter to top of splash with no joints from horizontal to vertical application. No joints shall occur at sink openings.
 3. At exposed countertop end corners, provide one-inch (1") radius, or similar safety treatment.
- E. Toe Spaces: Leave toe spaces unfinished for installation of resilient base, unless otherwise shown.
- F. End Panels and Filler Strips: Match adjacent case-piece.
- G. Edging:
1. Provide the following in accordance with "Edging Locations:"
 - a. Flat edge PVC: 0.020 inch. Solid, high-impact, purified, color-thru, acid resistant, machine-applied with hot melt adhesives.
 - b. Three-millimeter (3 mm) PVC: Solid, high-impact, purified, color-thru, acid resistant, pre-lamination primed edging, machine-applied with hot melt adhesives, and machine profiled to 1/8-inch radius.
 2. Edging locations:

- a. Cabinet body edge, including door/drawer front spacer rail: Flat edge PVC, color matched to door/drawer face or as selected.
- b. Forward edge of interior body components, interior dividers, shelf, and top edges of drawer body: Flat edge PVC to match cabinet interior surface color.
- c. Door/drawer-front edging: Three-millimeter (3 mm) PVC, color matched to standard laminates.

2.3 CABINET HARDWARE

- A. All hardware shall meet ANSI A156.9 and shall be subject to approval by the Architect. All keying shall match existing master key system and be approved by the Owner:
 1. Acceptable manufacturers:
 - a. Knappe & Vogt., Blum, Rev A Shelf, Slide-A-Shelf
 - b. As specified herein, provide specified product, or Architect approved equal.
- B. Hinges:
 1. Heavy duty, five-knuckle 2-3/4-inch institutional type hinge shall meet ANSI/BHMA A156.9 Grade 1 requirements. Mill ground, hospital tip, Teflon coated tight pin feature with all edges eased. Hinge shall be full wrap around type of tempered steel 0.095 inch thick. Each hinge shall have minimum of nine (9) screws, #7, 5/8-inch FHMS to assure positive door attachment.
 2. One (1) pair per door to 48 inches height. 1-1/2 pair over 48 inches in height. Hinge shall accommodate 13/16 thick laminated door and allow 270-degree swing.
 3. Finish: US26D.
- C. Pulls: Wire design, four inches (4"), satin chrome, US26D finish.
- D. Sliding Door Hardware:
 1. Frameless 1/4-inch glass sliding doors; double track rolling door assembly.
 2. Framed 13/16-inch thick stile and rail sliding doors; top mounted track with dual roller hangers. Vertical adjustment for accurate alignment.
- E. Drawer Slides:
 1. Standard drawers: 3/4 extension, self-closing, white epoxy-coated, lever disconnect, positive in-stop/out-stop, nylon rollers, minimum 100-pound dynamic load rating at full extension.
 2. Paper storage drawers: Full extension, self-closing, white epoxy-coated, lever disconnect, positive in-stop/out-stop, nylon rollers, minimum 150-pound dynamic load rating at full extension.
- F. Catches:
 1. Provide opening resistance in compliance with the Americans with Disabilities Act:
 - a. Provide top-mounted magnetic catch for base and wall cabinet door.
 - b. Provide two (2) at each tall cabinet door. Catch housing shall be molded in White.
- G. Adjustable Shelf Supports:
 1. Dual-pin design with anti-tip-up shelf restraints for both 3/4-inch and one-inch (1") shelves.
 2. Include keel to retard shelf slide-off, and slot for mechanical attachment of shelf to clip.
 3. Load rating shall be minimum 300 pounds each support without failure.
- H. Wardrobe Rod: 1-1/6-inch diameter plated steel rod, with captive sockets.
- I. Coat Hooks: Single and double prong, wall mount - satin aluminum.

- J. Locks: Five-disk tumbler cam-style with strike. Locks on cabinets in same room keyed alike. Provide two (2) keys per room where doors and drawers are scheduled to receive locks. Dull chrome finish. Lock core shall be removable with a control key, permitting Owner to change lock arrangements without tools.

2.4 SPECIALTY ITEMS

- A. Grommets:
1. Approved Product/Manufacturer: Model No. EDP3 manufactured by Doug Mockett & Company, Inc. (basis of design), Manhattan Beach, CA; (800) 523-1269, or Architect approved equal.
 2. Size: 2-1/2 inches diameter with "Flip-Top"™ tab in cap.
 3. Colors: As selected by Architect from manufacturer's available colors.
 4. Number/location: Where electrical, telephone, and computer data wiring need to pass through tops whether shown or not.
- B. Keyboard Drawers (at all knee spaces):
1. Approved product/manufacturer: No. SD-1 as manufactured by Knape & Vogt; or Architect approved equal.
- C. Molded Personal Pencil Drawer: High-impact 100 Polystyrene with in-stop, out-stop, and self-closing features. Provide under top mounted 100-pound self-closing slides. Twelve (12) compartment drawer body, and slides, black. Provide where indicated on plans.
- D. Mailbox Label Holder: Brass, card size 1/2-inch by 2-3/16 inches. Provide one (1) at each opening.

2.5 SOLID STOCK

- A. Moisture Content: Percent of moisture in relation to over-dry weight shall be between eight percent (8%) and 13 percent at time of installation.
- B. Natural Finish Hardwood:
1. Occasional knot permitted provided it is tight and smooth.
 2. Grain pattern: Rift-cut.
 3. Species: WI "Premium" Grade, white oak.
- C. Paint Grade Hardwood: Any species, including Parana Pine, except do not use oak, elm, or similar species that have coarse grain.

2.6 MISCELLANEOUS

- A. Utility Shelving: WI "Economy" grade.
- B. Clothes Rod: 1-1/2 inch diameter smooth wooden dowel by length required, with end supports and fasteners of type recommended to suit application.
- C. Telephone/MDF/IDF Board: Provide minimum four foot by eight foot by 3/4-inch (4' x 8' x 3/4") thick plywood for telephone/data punch down blocks and video equipment in accordance with Section 06 10 00: Rough Carpentry. Paint in accordance with Section 09 90 00: Painting and Coating.

2.7 MILLWORK FABRICATION

- A. Use the WI Custom Grade woodwork classification unless noted elsewhere complying with

referenced quality standard.

- B. Fabricate casework, countertops, and related products to dimensions, profiles, and details shown on Drawings. Fabricate casework square, plumb, and true.
- C. Detailed Requirements for Cabinet Construction:
 - 1. Toe-base:
 - a. Continuous, ladder type platform with concealed fastening to cabinet bottom, level and secured to floor.
 - b. Toe-base at exposed cabinet end panels shall be recessed ¼-inch from face of finished end for flush installation of finished base material.
 - c. No cabinet sides-to-floor will be allowed.
 - 2. Cabinet top and bottom:
 - a. Solid sub-top shall be furnished for all base and tall cabinets.
 - b. At cabinets over 36-inches, bottoms and tops shall be mechanically joined by a fixed divider.
 - c. Assembly devices shall be concealed on bottom side of wall cabinets.
 - 3. Cabinet sides:
 - a. Doweled, and glued under pressure, or attached with fully concealed interlocking mechanical fasteners to sub-top and bottom.
 - b. Drill holes for adjustable shelves 1-1/4 inch on center.
 - 4. Cabinet backs:
 - a. Side bound, captured in grooves, recessed from cabinet rear, and securely fastened at top and bottom.
 - b. Hang rails shall be located at rear of cabinet back and fastened to cabinet sides. Provide minimum of two (2) at base, two (2) at wall, and three (3) at tall cabinets as instructed by casework manufacturer.
 - c. Provide removable back panels and closure panels for plumbing access at all sink cabinets, and where shown on Drawings.
 - 5. Exposed end corner and face frame attachment:
 - a. Butt joint, glued and finish nailed; or attached with fully concealed interlocked mechanical fasteners.
 - 6. Door and drawer fronts:
 - a. Drawer fronts and hinged doors shall overlay the cabinet body. Maintain a maximum 1/8-inch reveal between pairs of doors, between door and drawer front, or between multiple drawer fronts within the cabinet.
 - b. Where indicated, provide stile and rail doors with full 1/4-inch plate glass, hinged or sliding. Exposed lite-opening edges shall be trimmed and glazed with extruded glazing bead.
 - c. Where indicated, frameless sliding glass doors shall be 1/4-inch thick plate glass with ground and polished edges. Fit with anodized aluminum shoes and nylon rollers.
- D. Drawers:
 - 1. Drawer fronts: Apply to separate drawer body component sub-front.
 - 2. Drawer sides: Doweled to receive front and back, glued under pressure, machine squared.
 - 3. Drawer bottom: Set into front and sides, 1/4-inch deep groove with minimum 3/8-inch standing shoulder, continuously glued. Reinforce drawer bottoms with ½-inch by four-inch (4") front-to-back intermediate underbody stiffeners, mechanically fastened. One (1) at 24 inches, two (2) at 36 inches, and over.
 - 4. Paper storage drawers: Fitted with full width hood at back.
 - 5. Hanging file drawers shall be fabricated to accept letter size hanging folders compatible with Pendaflex system.
- E. Vertical and Horizontal Dividers: As required by manufacturer for type and style of

component.

- F. Door/Drawer Front Rail: As required by manufacturer for type and style of component, and hardware placement.
- G. Accessibility Requirements - 2022 California Building Code, Section 11B:
 - 1. The following special requirements shall be met, where specifically indicated on architectural Plans as "accessible" or by general note. Shall be in compliance with California title 24 access:
 - a. Countertop height: With or without cabinet below, not to exceed a height of 34 inches above finished floor (A.F.F.), at a surface depth of 24 inches.
 - b. Knee space clearance: Minimum 27 inches A.F.F. at apron, and 30 inches clear span width (11B-306.3).
 - c. Sink cabinet clearances: In addition to above, upper knee space frontal depth shall be no less than eight inches (8"), and lower toe frontal depth shall be no less than 11 inches, at a point nine inches (9") A.F.F., and as further described in 11B-306.
- H. Typical Desk or Counter Height at Knee Space Locations: 30 inches A.F.F.

PART 3 EXECUTION

3.1 JOB CONDITIONS

- A. Environmental Requirements:
 - 1. Do not install casework until permanent HVAC systems are operating and temperature and humidity have been stabilized for at least one (1) week:
 - a. Manufacturer/supplier shall advise Contractor of temperature and humidity requirements for architectural casework installation areas.
 - b. After installation, control temperature and humidity to maintain relative humidity between 25 and 55 percent.
- B. Conditions: Do not store or install casework in building until concrete, masonry, and drywall/plaster work is dry.

3.2 COORDINATION

- A. Coordinate the work of this Section with plumbing work specified in Division 22. Coordinate sink opening construction with sinks specified in Division 22 or as indicated on Drawings.
- B. Coordinate location of blocking in walls for installation and support of wall cabinets.

3.3 MILLWORK INSTALLATION

- A. Positioning: Place approximately level, plumb, and at right angles to adjacent work.
- B. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging the products and adjacent work.
- C. Anchorage: Attach securely so the products will perform to their maximum ability without damage from inadequate fastenings.
- D. Fasten tops to frames with concealed clips, screws, and glue.
- E. Install simulated wood trim in locations shown on Drawings and in accordance with manufacturer's instructions.

3.4 FINISH HARDWARE INSTALLATION

- A. The supplier will mark each item of hardware for location. Protect the markings until each item is installed. If any item is delivered to the job not properly marked, return it to the supplier for marking before attempting to install it.
- B. Check markings on hardware for proper location. Install and make necessary adjustments for proper working order. Any hardware damaged by improper adjustment or careless abuse will be replaced by Contractor at his expense.
- C. Provide clean, properly sized, and accurately placed mortises and drilled holes for all mortise hardware such as locksets and for cylindrical locks where specified only.
- D. Fit all surface-applied hardware accurately.
- E. After hardware is installed, protect exposed surfaces by use of heavy paper and masking tape and maintain until job completion.
- F. Remove all finish hardware except that which is primed for painting before painter's finish is applied. Permanently replace and re-adjust for proper function after painter's finish has dried hard.
- G. Millwork contractor shall be responsible for hardware on millwork.

END OF SECTION 06 20 00

SECTION 07 92 00 JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements including but not limited to:
 - 1. Control and expansion joints on exposed interior and exterior surfaces.
 - 2. Perimeter joints between wall surfaces and frames of interior and exterior doors and openings.
 - 3. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - 4. Joints indicated or as necessary.
 - 5. Accessories necessary for a complete installation.
- B. Related Sections:
 - 1. Section 03 30 00: Cast-In-Place Concrete
 - 2. Section 09 90 00: Painting and Coating.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Technical data for each joint sealant product. Data to indicate elasticity and durability of each joint sealant product. Submit written certification from manufacturers of sealants attesting products are suitable for use indicated, verified through in-house testing laboratory:
 - a. Written certification from manufacturers of joint sealants attesting that products comply with specification requirements and suitable for use indicated verified through manufacturers testing laboratory within the past 36 months or since most recent reformulation, whichever is most recent:
 - 1) Complete instructions for handling, storage, mixing, priming, installation, curing, and protection of each type of sealant.
 - 2) Manufacturer's letter, clearly indicating proposed lot numbers of each sealant supplied and expiration date sequence.
 - 2. Recycled Content:
 - a. Indicate recycled content; indicate percentage of pre-consumer and postconsumer recycled content per unit of product.
 - b. Indicate relative dollar value of recycled content product to total dollar value of product included in Project.
 - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
 - 3. Local/regional materials:
 - a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the Project site.
 - b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the Project site.
 - c. Product value: Indicate dollar value of product containing local/regional materials; include materials cost only.

- d. Product component(s) value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
 4. VOC data: Submit manufacturer's product data for sealants. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
 5. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.
- B. Samples:
1. Provide color samples from full manufacturer's full range for each type of sealant specified for Architect's review.
- C. Certificates and Reports:
1. Product Certificates: Manufacturer's product certificate for each kind of joint sealant and accessory.
 2. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
 3. Product test reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
 4. Preconstruction compatibility and adhesion test reports:
 - a. From sealant manufacturer, indicating the following:
 - 1) Materials forming joint substrates and sealant backings have been tested for compatibility and adhesion with sealants.
 - 2) Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
 5. Preconstruction field adhesion test reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified.
 6. Field adhesion test reports: For each sealant application tested.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Firm having minimum five (5) years' documented experience and specializes in the installation of sealants:
 - a. Exposed sealant work (sealants used for air and weatherseals external at perimeter, metal panel to panel joints) shall be performed by a single (i.e. one) firm specializing in the installation of sealants who has successfully produced work comparable to Project.
 - b. Concealed sealant work (sealants that are internal to skylights and providing an air seal) shall be the responsibility of the subcontractor providing erection of the respective system.
- B. Source Limitations: Obtain each type of joint sealant from a single manufacturer.
- C. Product Testing:
1. Test joint sealants using a qualified testing agency:
 - a. Testing agency qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.
 - b. Test according to SWRI Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion in peel, and indentation hardness.
- D. Environmental Requirements:
1. Toxicity/IEQ:

- a. Comply with applicable regulations regarding toxic and hazardous materials:
 - 1) VOC content of interior sealants - sealants and sealant primers complying with limits for VOC content for SCAQMD when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a) Sealants: 250 g/L.
 - b) Sealant primers for nonporous substrates: 250 g/L.
 - c) Sealant primers for porous substrates: 775 g/L.
- b. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.

1.5 WARRANTY

- A. Written warranty, signed by installer agreeing to repair or replace elastomeric joint sealant work that has failed to provide a weathertight system within specified warranty period:
 1. Warranty period: Five (5) years from date of Substantial Completion.
- B. Written warranties (weatherseal and stain resistance), signed by sealant manufacturer agreeing to furnish joint sealants to repair or replace those that fail to provide airtight and watertight joints, or fail in adhesion, cohesion, abrasion resistance, stain resistance, weather resistance, durability, or appear to deteriorate in manner not specified in the manufacturer's data as an inherent quality of the material within specified warranty period:
 1. Warranty period: Five (5) years from date of Substantial Completion.
- C. Warranties specified exclude deterioration or failure of sealants from:
 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Compatibility: Provide joint sealants, backings, and related materials compatible with one another and with joint substrates under conditions of service and application, as stated by sealant manufacturer's published data, and as substantiated by the manufacturer for each application through testing.
- B. Liquid Applied Sealants: Comply with ASTM C920 and requirements indicated for each liquid applied sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.

- C. Stain Test Response Characteristics: For sealants in contact with porous substrates, provide nonstaining products that have undergone testing according to ASTM C1248 and do not stain porous joint substrates.
- D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Colors: For fully concealed joints, provide standard color of sealant that has the best overall performance characteristics for the application shown. For exposed joints, submit color samples to Architect for approval, from manufacturer's full line of standard colors.
- F. Manufacturer's Representative: Use sealant produced by manufacturer who agrees to send a qualified technical representative to site upon request for the purpose of rendering advice concerning the recommended installation of manufacturer's materials.
- G. Sealants: Self-leveling compounds for horizontal joints in pavements and non-sag compounds elsewhere except as shown or specified.
- H. Silicone Sealant:
 - 1. ASTM C920, Type S, Grade NS, Class 50, for Use NT:
 - a. Use: Typical joints between masonry, metals, glass, and plastics (single component sealants).
 - b. Properties:
 - 1) Performance: Non-stain, non-bleed, non-streaking to sealed and adjacent substrates.
 - 2) Cure system and oil content: Neutral cure system specifically manufactured with controlled oil content to eliminate oil migration into sealed substrates and residue rundown over and onto adjacent substrates.
 - c. Product and manufacturer:
 - 1) BASF Building Systems; Omniseal 50.
 - 2) Dow Corning Corporation; 756 SMS, 791, 795, 995 as applicable.
 - 3) GE Advanced Materials, Silicones; SilGlaze II SCS2800, SilPruf NB SCS9000, SilPruf SCS2000, or UltraPruf II SCS2900 as applicable.
 - 4) Pecora Corporation, as applicable.
 - 5) Sika Corporation, Construction Products Division; SikaSil-C995.
 - 6) Tremco, as applicable.
 - 7) Comparable product.
- I. Polyurethane Sealants:
 - 1. ASTM C920, Type M, Grade NS, Class 25; use NT, M, A and O:
 - a. Use: Typical Wall and floor joints (two-part polyurethane sealants). Use at concrete joints.
 - b. Properties:
 - 1) Performance: Non-stain, non-bleed, non-streaking to sealed and adjacent substrates.
 - c. Products and manufacturers:
 - 1) BASF Building Systems; Sonolastic NP-2.
 - 2) Pecora Corporation; Dynatred.
 - 3) Sika Corporation, Construction Products Division; Sikaflex 2c NS or Sikaflex 2c NS TG as applicable.
 - 4) Tremco, as applicable.
 - 5) Comparable product.
- J. Mildew Resistant Silicone Sealant:
 - 1. ASTM C920, Type S, Grade NS, Class 25, Use NT, Substrate uses G, A, and O; and

containing fungicide for mildew resistance; acid curing:

- a. Use: One-part mildew-resistant silicone, formulated with fungicide for sealing interior joints of nonporous substrates around ceramic tile, plumbing fixtures, and showers.
 - b. Products - provide one of the following:
 - 1) BASF Building Systems; Omniplus.
 - 2) Dow Corning; 786 Mildew Resistant Silicone Sealant.
 - 3) GE Silicones; Sanitary SCS 1700.
 - 4) Pecora Corporation, as applicable.
 - 5) Sika Corporation, Inc., as applicable.
 - 6) Tremco, as applicable.
 - 7) Comparable product.
- K. Sealant Backing:
1. Provide sealant backings that are non-staining, compatible with joint substrates, sealants, primers, and joint fillers, and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing:
 - a. Cylindrical sealant backings: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding backings of flexible plastic foam complying with ASTM C1330, and of type indicated below. Select shape and density of cylindrical sealant backings in consultation with the manufacturer for proper performance in specific condition of use in each case.
 - b. Type C - closed cell polyethylene foam material with surface skin, nonabsorbent to liquid water and gas, non-outgassing in unruptured state; provide one of the following:
 - 1) BASF, as applicable.
 - 2) HBR Closed Cell Backer Rod; Nomaco, Inc.
 - 3) Pecora Corporation, as applicable.
 - 4) Sonolastic Closed-Cell Backer-Rod; BASF Construction Chemicals.
 - 5) Tremco, as applicable.
 - 6) Comparable product.
- L. Miscellaneous Materials:
1. Primer: Material recommended, as verified through compatibility and adhesion testing, by joint sealant manufacturer for the substrates indicated to be sealed.
 2. Cleaners for nonporous surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants with joint substrates.
 3. Masking tape: Non-staining, non-absorbent material compatible with joint sealants and that will not stain nor mar the finish of surface adjacent to joints to which it is applied.
 4. Cork joint filler: Resilient and non-extruding, ASTM D1752, Type II.
 5. Bond breaker tape: Polyethylene, TFE fluorocarbon, or plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

- A. Environmental Limitations:
1. Do not proceed with installation of joint sealants under the following conditions:
 - a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 degrees F (4.4 degrees C).

- b. When joint substrates are wet. Should joints or backing materials become wet, remove and replace backing material with new.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

3.2 EXAMINATION

- A. Examine joints indicated to receive joint sealants for compliance with requirements for joint configuration, installation tolerances, and conditions affecting sealant performance. Proceed with installation after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Surface Cleaning of Joints:
 - 1. Clean out joints immediately before installing joint sealants to comply with the recommendations of joint sealant manufacturer and requirements:
 - a. Remove foreign material from joint substrates interfering with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), existing joint sealants, oil, grease, water, surface dirt, and frost.
 - b. Clean concrete, masonry, unglazed surfaces of tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil free compressed air.
 - c. Remove laitance and form-release agents from concrete.
 - d. Clean metal, glass, porcelain enamel, glazed surfaces of tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming (Elastomeric Sealants Only): Prime joint substrates where recommended in writing by joint sealant manufacturer, based on prior testing and experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.4 INSTALLATION

- A. Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants applicable to materials, applications, and conditions indicated.
- C. Sealant Backings:
 - 1. Install sealant backings to support sealants during application and at position

necessary to produce cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability:

- a. Do not leave gaps between ends of sealant backings. Trim for tight fit around obstructions or elements penetrating the joint.
- b. Do not stretch, twist, puncture, or tear sealant backings.
- c. Remove absorbent sealant backings that become wet before sealant application and replace with dry sealant backings.
- d. Install bond breaker tape behind sealants where backings are not used between sealants and back of joints.

D. Sealants:

1. Install sealants by proven techniques resulting in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at same time sealant backings are installed:
 - a. Apply sealants in depth in accordance with manufacturer's recommendations and recommended general proportions and limitations.
 - b. Apply elastomeric sealants, in joints not subject to traffic or abrasion, to a depth equal to 50 percent of the joint width, but not less than 1/4 inch (6 mm) and not more than 1/2 inch (13 mm).
 - c. Apply non-elastomeric sealants to a depth approximately equal to the joint width.

E. Tooling of Non-Sag Sealants:

1. Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform, beads to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces. Tool exposed surfaces of sealants to the profile shown, or if none is shown, tool slightly concave:
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.
 - b. Provide a slight wash on horizontal joints where horizontal and vertical surfaces meet.
 - c. Against rough surfaces or in joints of uneven widths avoid the appearance of excess sealant or compound by locating the compound or sealant well back into joint wherever possible.

F. Installation of Preformed Silicone Sealant System:

1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch (10 mm). Hold edge of sealant bead 1/4 inch (6 mm) inside masking tape.
3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

- G. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.5 FIELD QUALITY CONTROL

- A. Field Adhesion Testing:
1. Field test exterior wall joint sealant adhesion to joint substrates:
 - a. Extent of testing - test completed and cured sealant joints:
 - 1) Perform ten (10) tests for the first 1,000 feet (300 m) of joint length for each kind of sealant and joint substrate.
 - 2) Perform one (1) test for each 1,000 feet (300 m) of joint length thereafter or one (1) test per each floor per elevation.
 2. Test method: Test joint sealants according to Method A, Field Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer field adhesion hand pull test criteria.
 4. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure original sealant surfaces are clean and new sealant contacts original sealant.
- B. Evaluation of Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.6 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality: Provide temporary ventilation during work. Coordinate interior application of sealants with interior finishes schedule.

3.7 CLEANING AND PROTECTION

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- B. Protect joint sealants during and after curing from contact with contaminating substances and from damage so sealants are without deterioration or damage at time of Substantial Completion. If, despite protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 07 92 00

SECTION 09 21 16 GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements including but not limited to:
 - 1. Gypsum Board.
 - 2. Reinforced Gypsum Board Sheathing (Tile Backer Board).
 - 3. Accessories necessary for a complete installation.
- B. Related Sections:
 - 1. Section 06 10 00: Rough Carpentry.
 - 2. Section 09 30 00: Tiling.

1.3 PERFORMANCE REQUIREMENTS

- A. Comply with manufacturer's load tables and the following design pressures and deflections:
 - 1. Stairs, Elevator Hoistways, and Vertical Shafts: 1/120 at 10 psf.
 - 2. Ground Floor Lobbies: 1/120 at 15 psf.
 - 3. Partitions Receiving Lath and Plaster, or Plaster Veneer: 1/360 at 15 psf.
 - 4. Partitions Receiving Monitors, Televisions, Heavy Audio/Visual Equipment: 1/360 at 15 psf.
 - 5. Typical Partitions: 1/240 at 5 psf.
 - 6. Other Partitions: 1/240 at 5 psf.
 - 7. Maximum Deflection:
 - a. L/240 at 5 lbf per sq. ft.
 - b. L/120 at 5 lbf per sq. ft.
 - c. L/120 at 7.5 lbf per sq. ft.
 - d. L/120 at 10 lbf per sq. ft.
- B. Fire Resistance Rated Assemblies: For fire resistance rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- C. STC Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

1.4 SUBMITTALS

- A. Product Data: Submit For each type of drywall including calculations for loadings and stresses of exterior walls and specially fabricated framing based on manufacturer's load tables.
- B. Shop Drawings: Indicate locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.

- C. Samples:
 - 1. Trim Accessories: Full size Sample in 12-inch (300 mm) long length for each trim accessory indicated.
 - 2. Textured Finishes: 12 inches by 12 inches (300 mm by 300 mm) for each textured finish indicated and on same backing indicated for Work.
- D. Calculations: Submit calculations verifying steel partition stud minimum base metal thickness and depth compliance with Code and ASTM C645 for height, load, and deflection.
- E. Evaluation Reports: ICC-ES reports for dimpled steel studs and runners and firestop tracks.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. 2022 California Building Code (CBC) (CCR Title 24, Part 2, as adopted and amended by DSA):
 - a. CBC– Chapter 7, Fire Resistant Materials and Construction
 - b. CBC – Chapter 19A, Concrete
 - c. CBC – Chapter 25, Gypsum Board and Plaster.
 - 2. Division of the State Architect, Interpretation of Regulations (DSA-IR):
 - a. DSA-IR 25-3, Drywall Ceiling Suspension Conventional Construction-One Layer.
 - b. DSA-IR 25-2.13, Metal Suspension Systems for Lay in Panel Ceilings.
 - 3. Fire Resistance Rated Assemblies: For fire resistance rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
 - 4. Fire Resistance Rated Assemblies: For fire resistance rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. Single Source Responsibility:
 - 1. Wood Framing Members: Refer to drawing S0.03 Standard General Notes.
 - 2. Steel Framing Members: Obtain steel framing members from single manufacturer.
 - 3. Panel Products: Obtain each type of gypsum board and other panel products from single manufacturer.
 - 4. Finishing Materials: To the extent possible, obtain finishing materials from same manufacturer supplying gypsum board products. When not possible, obtain materials from manufacturer acceptable to gypsum board manufacturer.

1.6 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 potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - 1. Gypsum Board.

- B. Gypsum Board - ASTM C1396/C1396M, applicable to type of gypsum board indicated and whichever is more stringent:
1. Core - Use Type X throughout:
 - a. Thickness: 5/8 inch (15.9 mm).
 - b. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
 2. Ceiling Type - Manufactured for sag resistance:
 - a. Thickness: 1/2 inch (13mm).
 - b. Long Edges: Tapered.
 3. Moisture and Mold Resistant Type - Type X with moisture and mold resistant core and surfaces. Core:
 - a. Thickness: 5/8 inch (15.9 mm).
 - b. Long Edges: Tapered.
- C. Reinforced Gypsum Sheathing (Tile Backer Board) - ASTM C1278/C1278M, standard edges. Cellulose fiber reinforced panels may be used in lieu of cementitious board:
1. Core and Thickness: 1/2 inch (12.7 mm) or 5/8 inch (15.9 mm) to match conditions, Type X.
 2. Long Edge: Tapered.
 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- D. Interior Trim - ASTM C1047, galvanized or aluminum coated steel sheet, rolled zinc, plastic, or paper faced galvanized steel sheet:
1. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC Bead: J shaped; exposed long flange receives joint compound.
 - d. L Bead: L shaped; exposed long flange receives joint compound.
 - e. U Bead: J shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 2. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Pittcon Industries.
 - b. Fry Reglet Corp.
 - c. Gordon, Inc.
- E. Continuous Corner - Extruded Aluminum, continuous integral fin for surface contact with gypsum board; 7/8-inch (22 mm) wide, tapered to edge; punched with holes staggered to accept screw fastening. Prime with corrosion resistant primer. Provide Pittcon Softforms (Basis of Design) or Schluter:
1. Subject to compliance with requirements, provide basis of design or comparable by one of the following:
 - a. Pittcon Industries.
 - b. Fry Reglet Corporation.
 - c. Schluter.
- F. Joint Treatment - ASTM C475/C475M:
1. Joint Tape:
 - a. Exterior Gypsum Soffit Board: USG Sheetrock Brand Paper Tape.
 - b. Glass Mat Gypsum Sheathing Board Exterior Applications: USG Sheetrock Brand Paper Tape.
 - c. Interior Gypsum Board: USG Sheetrock Brand Paper Tape.
 - d. Cementitious Board: USG Durock Tape.
 2. Joint Compound:
 - a. Gypsum Board – Prefilling - At open joints, rounded or beveled panel edges, and damaged surface areas, use setting type taping compound: USG Sheetrock Brand

Easy Sand Setting-Type Joint Compound:

- 1) Embedding and First Coat - For embedding tape and first coat on joints, fasteners, and trim flanges, use setting type taping compound. USG Sheetrock Brand All Purpose Joint Compound:
 - a) Use setting type compound for installing paper faced metal trim accessories: USG Sheetrock Brand All Purpose Joint Compound.
- 2) Fill Coat: For second coat, use setting type, sandable topping compound: USG Sheetrock Brand Topping Joint Compound.
- 3) Finish Coat: For third coat, use setting type, sandable topping compound: USG Sheetrock Brand Topping Joint Compound.
- 4) Skim Coat: For final coat of Level 4 finish, use setting type, sandable topping compound: USG Sheetrock Brand Topping Joint Compound.

G. Auxiliary Gypsum Materials - Comply with referenced installation standards and manufacturer's written recommendations:

1. Steel Drill Screws: ASTM C1002, 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.
2. Sound Attenuation Blankets:
 - a. ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool:
 - 1) Fire Resistance Rated Assemblies: Comply with mineral-fiber requirements of assembly.
3. Acoustical Sealant:
 - a. Nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90:
 - 1) USG Corporation; Sheetrock Brand Acoustical Sealant

H. Ceiling Suspension Components:

1. Tie Wire Ceiling Grid:
 - a. USG Corporation; Drywall Suspension System.
 - b. ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.0625-inch (1.59 mm) diameter wire, or double strand of 0.0475-inch (1.21 mm) diameter wire.
2. Hanger Attachments to Concrete:
 - a. Anchors: Postinstalled, chemical anchor or postinstalled, expansion anchor fabricated from corrosion resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E488 by an independent testing agency.
 - b. Powder Actuated Fasteners: Suitable for application indicated, fabricated from corrosion resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E1190 by an independent testing agency.
3. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12 mm) diameter.
4. Carrying Channels: Cold rolled, commercial steel sheet with base metal thickness of 0.0538-inch (1.37 mm) and minimum 1/2-inch (12.7 mm) wide flanges. Depth indicated on Drawings.
5. Furring Channels (Furring Members):
 - a. Cold Rolled Channels: 0.0538-inch (1.37 mm) bare steel thickness, with minimum 1/2-inch (12.7 mm) wide flanges, 3/4 inch (19.1 mm) deep.
 - b. Hat Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch (22.2 mm) deep; Minimum base metal thickness of 0.0312 inch (0.79 mm).

6. Resilient Furring Channels: 1/2 inch (12.7 mm) deep members designed to reduce sound transmission. Configuration: Hat shaped.
7. Grid Suspension System for Ceilings: ASTM C645, direct hung system composed of main beams and cross furring members that interlock.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

- A. Environmental Limitations:
 1. Comply with ASTM C840 for gypsum board manufacturer's written instructions, whichever are more stringent:
 - a. Do not install paper faced gypsum panels until installation areas are enclosed and conditioned.
- B. Room Temperatures: Maintain minimum 40 degrees F (4 degrees C). For adhesive attachment and finishing of gypsum board, maintain minimum 50 degrees F (10 degrees C) for 48 hours before application and continuously after until dry. Do not exceed 95 degrees F (35 degrees C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.
- D. Do not install 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.

3.2 EXAMINATION

- A. Examine areas and substrates including welded hollow metal frames, cast in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.4 INSTALLATION

- A. Installation Standard: ASTM C754, except comply with framing sizes and spacing indicated.
- B. Gypsum Board Assemblies: Comply with requirements in ASTM C840 applicable to framing installation.
- C. Suspension System:
 1. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement:
 - a. Suspend hangers from building structure:

- 1) Install hangers plumb and free from contact with insulation or objects within ceiling plenum that are not part of supporting structural or suspension system. Splay hangers where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2) Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices:
 - a) Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 - 3) Do not attach hangers to steel roof deck.
 - 4) Do not attach hangers to permanent metal forms. Furnish cast in place hanger inserts that extend through forms.
 - 5) Do not attach hangers to rolled in hanger tabs of composite steel floor deck.
 - 6) Do not connect or suspend steel framing from ducts, pipes, or conduit.
 - b. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
- D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross furring members to each other and butt cut to fit into wall track.
- E. Sound Insulation: Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- F. Gypsum Panels:
1. Comply with ASTM C840. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged:
 - a. 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.
 - b. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
 - c. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
 - d. Form control and expansion joints with space between edges of adjoining gypsum panels.
 - e. Cover both faces of support framing with gypsum panels in concealed spaces, 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. (0.7 sq. m) in area.
 - 2) Fit gypsum panels around ducts, pipes, and conduits.
 - 3) Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4-inch to 3/8-inch (6.4 mm to 9.5 mm) wide joints to install sealant.
 - f. Isolate perimeter of gypsum board applied to nonload bearing partitions at structural abutments, except floors. Provide 1/4-inch to 1/2-inch (6.4mm to

12.7mm) 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.

- g. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

G. Gypsum Board:

- 1. Install interior gypsum board where indicated on drawings:
 - a. Single Layer Application:
 - 1) On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
 - 2) On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire resistance rated assembly, and minimize end joints. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - 3) Fastening Methods: Apply gypsum panels to supports with steel drill screws.
 - 2. Multilayer Application:
 - a. 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.
 - b. On Z shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 - c. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

H. Trim Accessories:

- 1. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Attach trim according to manufacturer's written instructions:
 - a. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.
 - b. Exterior Trim: Install in the following locations:
 - 1) Cornerbead: Use at outside corners.
 - 2) LC Bead: Use at exposed panel edges.
 - c. Interior Trim - Install in the following locations:
 - 1) Cornerbead: Use at outside corners, unless otherwise indicated.
 - 2) Bullnose Bead: Use at outside corners.
 - 3) LC Bead: Use at exposed panel edges.
 - 4) L Bead: Use where indicated or necessary.
 - 5) U Bead: Use at exposed panel edges.

I. Gypsum Board Finishing:

- 1. Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces:
 - a. Prefill open joints, rounded or beveled edges, and damaged surface areas.
 - b. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
 - c. Gypsum Board Finish Levels - Finish panels to levels indicated below and according to ASTM C840:
 - 1) Level 1: Ceiling plenum areas, concealed areas, and where indicated.

- 2) Level 2: Panels that are substrate for tile.
 - 3) Level 3: Surfaces be coated with drywall primer prior to final finishes. Heavy or medium texture finishes before final painting, or where heavy-grade wall coverings are to be applied as the final decoration. This level of finish is not recommended where smooth painted surfaces, or light to medium weight wall coverings as specified.
 - 4) Level 4: For surfaces receiving wall covering and flat paints.
 - 5) Level 5: For surfaces receiving gloss or semigloss paint and surfaces subjected to severe lighting. To be used in Kitchen areas and food service areas only.
- d. Glass Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
 - e. Glass Mat Faced Panels: Finish according to manufacturer's written instructions.
- J. Installation Tolerances:
1. Suspension System: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
 2. Installation Tolerances, Suspension System: Install suspension systems level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.5 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged:
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 21 16

SECTION 09 30 00 TILING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements including but not limited to:
 - 1. Ceramic mosaic tile.
 - 2. Accessories required for indicated installation.
- B. Related Sections:
 - 1. Section 09 21 16: Gypsum Board Assemblies.
 - 2. Section 09 65 13.13: Resilient Base.

1.3 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction:
 - 1. Level Surfaces: Minimum 0.6.
 - 2. Ramp Surfaces: Minimum 0.8.
- B. Ceramic Tile Flooring should be stable, firm, and slip resistant, pursuant to 2022 CBC Section 11B-302.1.

1.4 SUBMITTALS

- A. Product Data: Technical data including data sheets, installation recommendation, and recommended joint widths.
- B. Shop Drawings - Show locations of each type of tile and tile pattern:
 - 1. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples - Submit samples showing full range of color and texture variations expected:
 - 1. Full size units of each type and composition of tile and for each color and finish required.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required; minimum 12 inches (300 mm) square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed work.
 - 3. Waterproof membrane in 6 x 6-inch sample.
 - 4. Thresholds in 6-inch (150 mm) lengths.
- D. Test Reports: Submit test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements for slip resistance.
- E. Maintenance Instructions: Submit maintenance instructions for each type of product specified.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Building Code: Comply with applicable requirements for the CBC for interior finishes.
 - 2. Surface Burning Characteristics - ASTM E84; identify products with appropriate markings of applicable testing agency:
 - a. Flame Spread Index: 25 or less.
 - b. Smoke Developed Index: 450 or less.
 - 3. Accessibility Requirements - Comply with applicable requirements:
 - a. Americans with Disabilities Act of 1990, as amended:
 - 1) ADA Title II Regulations & the 2010 ADA Standards for Accessible Design.
 - b. 2022 California Building Code (CBC) (CCR Title 24, Part 2, as adopted and amended by DSA):
 - 2) CBC Chapter 11B, Access to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing.
- B. Source Limitations for Tile: Obtain tile of same type and color or finish from one source or producer. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- D. Source Limitations for Other Products - Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
 - 1. Stone thresholds.
 - 2. Waterproofing.
 - 3. Joint sealants.
 - 4. Cementitious backer units.
 - 5. Metal edge strips.
- E. Mockups:
 - 1. Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:
 - a. Build mockup of each type of floor tile installation.
 - b. Build mockup of each type of wall tile installation.
 - c. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided. Store liquid materials in unopened containers and protected from freezing.
- C. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

PART 2 PRODUCTS

2.1 MATERIALS

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated. Provide tile complying with Standard grade requirements.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting:
 - 1. For factory mounted tile, provide back or edge mounted tile assemblies as standard with manufacturer unless otherwise indicated:
 - a. Where tile is indicated for installation in swimming pools, on exteriors or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.2 TILE PRODUCTS

- A. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - 1. Ceramic Tile:
 - a. American Marazzi Tile, Inc.
 - b. American Olean; a Division of Dal-Tile Corporation.
 - c. Crossville, Inc.
 - d. Daltile.
 - e. Emser Tile.
 - f. Trinity Tile.
 - g. Interceramic.
 - h. Concept Surfaces, LLC.
- B. Ceramic Floor Tile - Factory mounted unglazed ceramic mosaic tile:
 - 1. Basis of Design Product/Manufacturer: As indicated in the Drawings.
 - 2. Type: As indicated in the Drawings.
 - 3. Module Size: Refer to Finish Schedule in the Drawings.
 - 4. Thickness: 1/4 inch (6.4 mm).
 - 5. Face: Plain with cushion edges.
 - 6. Surface: Smooth, without or slip resistant, with abrasive admixture.
 - 7. Dynamic Coefficient of Friction: Not less than 0.42.
 - 8. Location: As indicated in the Drawings.
 - 9. Grout Color: As indicated in the Drawings.
 - 10. Tile color: As indicated on Drawings or as selected by Architect.
- C. Ceramic Wall Tile - Glazed tile:
 - 1. Basis of Design Product/Manufacturer: **Daltile**
 - 2. Composition: Impervious natural clay tile.
 - 3. Module Size: 4 1/4 inches, square.
 - 4. Thickness: 5/16 inch (8 mm).
 - 5. Face: Plain with cushion edges.
 - 6. Surface: Matte glazed.
 - 7. Base: Six (6) inch high x Six (6) inch wide ceramic tile cove base to match wall tile.

8. Tile Color and Pattern: Refer to Drawings.
 9. Grout Color: Selected by Architect unless noted otherwise.
 10. Trim Units - Coordinated with sizes and coursing of adjoining flat tile where applicable matching characteristics of adjoining flat tile. Provide shapes selected from standard shapes:
 - i. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 1 inch by 1 inch (25.4 mm by 25.4 mm) or 2 inch by 1 inch (50.8 mm by 25.4 mm) or 2 inch by 2 inches (50.8 mm by 50.8 mm).
 - j. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - k. External Corners for Thinset Mortar Installations: Surface bullnose, module size 1 inch by 1 inch (25.4 mm by 25.4 mm) or 2 inch by 1 inch (50.8 mm by 25.4 mm) or 2 inch by 2 inches (50.8 mm by 50.8 mm).
 - l. Internal Corners: Cove, module size 1 inch by 1 inch (25.4 mm by 25.4 mm) or 2 inches by 1 inch (50.8 mm by 25.4 mm).
 - m. Internal Corners: Field-buttet square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.
 - n. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch (12.7 to 6.4 mm) across nominal 4 inch (100 mm) dimension.
- D. Threshold - Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes:
1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.
 2. Granite Thresholds - ASTM C615/C615M, with polished finish:
 - a. Description: Uniform, medium grained, black stone without veining.

2.3 WATERPROOF MEMBRANE

- A. Waterproof membrane complies with ANSI A118 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fluid Applied Membrane - Liquid latex rubber or elastomeric polymer:
1. Basis of Design - Laticrete 9235 Waterproofing Membrane. Subject to compliance with requirements, provide basis if design or comparable product by one of the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. TEC; H.B. Fuller Construction Products Inc.
- C. Fabric Reinforced, Fluid Applied Membrane - System consisting of liquid latex rubber or elastomeric polymer and continuous fabric reinforcement:
1. Basis of Design - Laticrete 9235 Waterproofing Membrane and reinforcing Fabric. Subject to compliance with requirements, provide basis if design or comparable product by one of the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. Merkrete by Parex USA, Inc.
- D. Latex Portland Cement Waterproof Mortar - Flexible, waterproof mortar consisting of cement based mix and latex additive:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:

- a. C-Cure.
 - b. MAPEI Corporation.
 - c. TEC; H.B. Fuller Construction Products Inc.
- E. Liquid Latex Waterproofing/Crack Isolation Membrane - Single Component, self-curing, load bearing liquid rubber polymer that forms a flexible seamless combined waterproofing membrane and crack isolation membrane compliance with ANSI A118:
1. Basis of Design - Hydroban by Laticrete International. Subject to compliance with requirements, provide basis of design or comparable product by one of the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. TEC; H.B. Fuller Construction Products Inc.

2.4 CRACK ISOLATION MEMBRANE

- A. Crack isolation membrane complying with ANSI A118 for standard performance and recommended by manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric Reinforced, Modified Bituminous Sheet - Self adhering, modified bituminous sheet with fabric reinforcement facing; 0.040-inch (1 mm) nominal thickness:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Custom Building Products.
 - b. MAPEI Corporation.
- C. Fluid Applied Membrane - Liquid latex rubber or elastomeric polymer:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Custom Building Products.
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation.
 - d. Merkrete by Parex USA, Inc.
 - e. TEC; H.B. Fuller Construction Products Inc.
- D. Fabric Reinforced, Fluid Applied Membrane - System consisting of liquid latex rubber or elastomeric polymer and fabric reinforcement:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Bonsal American, an Oldcastle company.
 - b. Bostik, Inc.
 - c. Custom Building Products.
 - d. Laticrete International, Inc.
 - e. MAPEI Corporation.
 - f. Merkrete by Parex USA, Inc.

2.5 SETTING MATERIALS

- A. Dry Set Mortar (Thinset) - ANSI A108:
1. Mortar Bed - Proportions of 1 part Portland Cement to 5 parts sand:
 - a. Portland Cement: ASTM C150, Type 1.
 - b. Sand: ASTM C144.
 - c. Water: Potable.
 2. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Custom Building Products.

- b. Laticrete International, Inc.
 - c. MAPEI Corporation.
 3. Wall Applications: Provide mortar complying with requirements for nonsagging mortar in addition to requirements in ANSI A108.
- B. Modified Dry Set Mortar (Thinset) - ANSI A118:
 1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. TEC; H.B. Fuller Construction Products Inc.
 2. Provide prepackaged, dry mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid latex additive at site.
 3. Wall Applications: Provide mortar complying with requirements for nonsagging mortar in addition to requirements in ANSI A118.
- C. Improved Modified Dry Set Mortar (Thinset) - ANSI A118:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. TEC; H.B. Fuller Construction Products Inc.
 2. Provide prepackaged, dry mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid latex additive at Project site.
 3. For wall applications, provide mortar complying with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.
- D. Modified Dry Set Mortar (Medium Bed): ANSI A118; product approved by manufacturer for application thickness of 5/8 inch (16 mm).
 1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. TEC; H.B. Fuller Construction Products Inc.
 2. Provide prepackaged, dry mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid latex additive at Project site.
- E. Portland Cement Mortar (Thickset) Installation Materials - ANSI A108:
 1. Mortar Bed - Proportions of 1 part Portland Cement to 5 parts sand:
 - a. Portland Cement: ASTM C150, Type 1.
 - b. Sand: ASTM C144.
 - c. Water: Potable.
 2. Cleavage Membrane: Asphalt felt, ASTM D226/D226M, Type I (No. 15); or polyethylene sheeting, ASTM D4397, 4.0 mils (0.1 mm) thick.
 3. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, 2 by 2 inches (50.8 by 50.8 mm) by 0.062-inch (1.57 mm) diameter; comply with ASTM A1064, except for minimum wire size.
 4. Expanded Metal Lath - Diamond mesh lath complying with ASTM C847:
 - a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
 - b. Base Metal and Finish for Exterior Applications: Zinc coated (galvanized) steel sheet.
 - c. Configuration over Studs and Furring: Flat.
 - d. Configuration over Solid Surfaces: Self furring.
 - e. Weight: 3.4 lb/sq. yd. (1.8 kg/sq. m).

5. Latex Additive: Styrene-butadiene-rubber water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex additive manufacturer for use with field mixed portland cement and aggregate mortar bed.
- F. Tile Setting Epoxy - ANSI A118, water cleanable; 100 percent solids epoxy grout:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Polyblend Tile Grout with 100% Solids Epoxy; Custom Building Products.
 - b. SpectraLOCK PRO Stainless Grout; Laticrete International, Inc.
 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 degrees F and 212 degrees F (60 degrees C and 100 degrees C), respectively, and certified by manufacturer for intended use.
 3. Color: Selected by Architect.
- G. EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar (Thinset) - ANSI A118:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. TEC; H.B. Fuller Construction Products Inc.
 2. Provide prepackaged, dry mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid latex additive at Project site.

2.6 GROUT MATERIALS

- A. Sand Portland Cement Grout - ANSI A108, consisting of white or gray cement and white or colored aggregate as required to produce color indicated:
1. Portland Cement: ASTM C150, Type 1.
 2. Lime: ASTM C206, Type S.
 3. Sand: ASTM C144.
- B. Commercial Cement Grout (Sanded Grout) - ANSI A118 for joints 1/8 inch (3.2 mm) or wider:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Custom Building Products.
 - b. Laticrete International, Inc.
 2. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid latex form for addition to prepackaged dry grout mix.
- C. High Performance Tile Grout - ANSI A118:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Custom Building Products.
 - b. Laticrete International, Inc.
 2. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid latex form for addition to prepackaged dry grout mix.
- D. Grout for PregROUTed Tile Sheets: Same product used in factory to pregROUT tile sheets.
- E. Water Cleanable Epoxy Grout - ANSI A118:
1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Polyblend Tile Grout with 100% Solids Epoxy; Custom Building Products.
 - b. SpectraLOCK PRO Stainless Grout; Laticrete International, Inc.
 - c. MAPEI Corp., Kerapoxy or Kerapoxy CQ Epoxy Grout.

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 degrees F and 212 degrees F (60 degrees and 100 degrees C), respectively, and certified by manufacturer for intended use.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex modified, portland cement-based formulation provided or approved by manufacturer of tile setting materials for installations indicated.
- B. Vapor Retarder Membrane: Polyethylene sheeting, ASTM D4397, 4.0 mils (0.1 mm) thick.
- C. Metal Edge Strips:
 1. Angle or L-shaped, height to match tile and setting bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless steel, ASTM A666, 300 Series exposed edge material.
 - a. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - 1) Blanke Corporation.
 - 2) Ceramic Tool Company, Inc.
 - 3) Schluter Systems L.P.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Tile and Grout Sealer - Sealer for sealing grout joints and that does not change color or appearance of grout:
 1. Manufacturers are subject to compliance with requirements; provide products by one of the following:
 - a. Custom Building Products.
 - b. Summitville Tiles, Inc.
 - c. TEC; H.B. Fuller Construction Products Inc.
- F. Sealant: Silicone sealant; refer to Section 07 92 00.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

- B. Contractor is required to achieve the specified concrete moisture content prior to installation of all flooring materials or use a flooring manufacture approved moisture barrier prior to installation of all flooring products.
- C. Maintain temperatures at 50 degrees F or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

3.2 EXTRA MATERIALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents:
 - 1. Tile and Trim Units: Furnish quantity of full size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

3.3 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of the work:
 - 1. Verify substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108 for installations indicated.
 - 2. Verify concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108 for installations indicated:
 - a. Verify surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation after correcting unsatisfactory conditions.

3.4 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108 and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at site before installing.

3.5 INSTALLATION

- A. Comply with TCNA *Handbook for Ceramic, Glass, and Stone Tile Installation* for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series *Specifications for Installation of Ceramic Tile* that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used:
 - 1. For the following installations, comply with ANSI A108 series procedures for tile installation standards for providing 95 percent mortar coverage:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas.
 - c. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.
 - d. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting bed thickness so tiles are flush.
- F. Jointing Pattern:
 - 1. Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated:
 - a. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 - b. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - c. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths - Unless otherwise indicated, install tile with the following joint widths:
 - 1. Ceramic Mosaic Tile: 1/8 inch (3.2 mm).
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints:
 - 1. Provide expansion joints and sealant filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw cut joints after installing tiles:
 - a. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- J. Thresholds:
 - 1. Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated:
 - a. At locations where mortar bed (thickset) would otherwise be exposed above

- adjacent floor finishes, set thresholds in modified dry set mortar (thinset).
- b. Do not extend cleavage membrane waterproofing or crack isolation membrane under thresholds set in standard dry set, modified dry set or improved modified dry set mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane, waterproofing, or crack isolation membrane with elastomeric sealant.
- K. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
- L. Floor Sealer: Apply floor sealer to grout joints according to floor sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- M. Waterproofing:
1. Install waterproofing to comply with ANSI A108 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate:
 - a. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.
- N. Crack Isolation Membrane:
1. Install crack isolation membrane to comply with ANSI A108 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate:
 - a. Allow crack isolation membrane to cure before installing tile or setting materials over it.
- O. Floor and Paver Tile and Planks - Install tile to comply with requirements in the TCNA installation methods and ANSI A108 series of tile installation standards:
1. Back Buttering - For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas, including showers, tub enclosures, laundries, and swimming pools.
 - c. Tile floors composed of tiles 8 inches by 8 inches (203 mm by 203 mm) or larger.
 - d. Tile floors composed of rib backed tiles.
- P. Floor Tile - Install tile to comply with requirements in the TCNA installation methods and ANSI A108 series of tile installation standards:
1. Back Buttering - For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas, including showers, tub enclosures, laundries, and swimming pools.
 - c. Tile floors composed of tiles 8 inches by 8 inches (203 mm by 203 mm) or larger.
 - d. Tile floors composed of rib backed tiles.
 2. Tile Installation Method:
 - a. Interior Floor Installations, Concrete Subfloor:
 - 1) TCNA F125-Full; thinset mortar on crack isolation membrane.
- Q. Wall Tile Installation:
1. Install types of tile designated for wall installations to comply with requirements, including those referencing TCNA installation methods and ANSI setting bed standards:

- a. Back Buttering - For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
 - 1) Exterior tile wall installations.
 - 2) Tile wall installations in wet areas, including showers, tub enclosures, laundries, and swimming pools.
 - 3) Tile installed with chemical resistant mortars and grouts.
 - 4) Tile wall installations composed of tiles 8 inches by 8 inches (203 mm by 203 mm) or larger.
- a. Tile Installation Method, Wood or Metal Studs:
 - 1) TCNA W245; thinset mortar on glass-mat, water-resistant gypsum backer board.

3.6 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning:
 1. On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter:
 - a. Remove grout residue from tile as soon as possible.
 - b. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.7 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 09 30 00

SECTION 09 51 00 ACOUSTICAL CEILING PANELS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements including but not limited to:
 - 1. Acoustical panels.
 - 2. Concealed and exposed suspension systems for ceilings.
 - 3. Accessories necessary for a complete installation.

1.3 SUBMITTALS

- A. Product Data: Technical data for each product including installation instructions.
- B. Samples:
 - 1. Acoustic Panel: Set of 6-inch (150 mm) square samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch (300 mm) long samples of each type, finish, and color.
- C. Coordination Drawings:
 - 1. Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - a. Suspended ceiling components.
 - b. Structural members to which suspension systems will be attached.
 - c. Size and location of initial access modules for acoustical panels.
 - d. Items penetrating finished ceiling including but not limited to the following:
 - 1) Lighting fixtures.
 - 2) Air outlets and inlets.
 - 3) Speakers.
 - 4) Sprinklers.
 - 5) Access panels.
 - e. Perimeter moldings.
- D. Maintenance Data: Manufacturer data for finishes for inclusion in maintenance manuals.
- E. Submit one copy of ICC-ES Reports.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Building Code:
 - a. Comply with applicable requirements of the 2025 California Building Code (CBC) for interior finishes:
 - 1) DSA Interpretation of Regulations – IR 25-2.13 Metal Suspension Systems for Lay-in Panel Ceilings.
 - 2) 2025 California Building Code.
 - 3) Chapter 19, 2025 California Building Code.

- 4) Chapter 23, 2025 California Building Code
- 5) Acoustical Panel Standard: ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance:
 - a) Mounting Method for Measuring NRC: Plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E795.
2. Surface Burning Characteristics:
 - a. Ceiling panels with surface burning characteristics complying with CBC and ASTM E1264 for Class A materials determined by testing identical products in accordance with ASTM E84:
 - 1) Flame Spread Index: 25 or less.
 - 2) Smoke Developed Index: 450 or less.
 3. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE 7.
 4. Fire Resistance Ratings: Comply with ASTM E119; testing by qualified testing agency. Identify products with appropriate markings of applicable testing agency. Indicate design designations from UL *Fire Resistance Directory* or from the listings of another qualified testing agency.
- B. Source Limitations:
 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
 2. Suspension System: Obtain each type through one source from a single manufacturer.
- C. Comply with applicable regulations regarding toxic and hazardous materials:
 1. Coating Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment; and showing no mold or mildew growth when tested in accordance with ASTM D3273.
 2. Panel Based Antimicrobial Treatment: Provide acoustical panels manufactured with antimicrobial treatment in the panels.
- D. Pre-installation Conference: Conduct conference at site.

1.5 WARRANTY

- A. Standard Ceiling Panels: Warrant ceiling panels to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects for a period of one (1) year from the date of Substantial Completion.
- B. Sag Resistant Ceiling Panels: warrant products to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects for a period of ten (10) years from the date of Substantial Completion.
- C. Standard Suspension System: Suspension systems shall be warranted to be free from defects in material or factory workmanship and shall not incur 50 percent red rust as defined by ASTM B117 test procedures for a period of ten (10) years from the date of Substantial Completion.
- D. Suspension system / ceiling panels: Provide manufacturers standard 15 year warranty for suspension systems when used in combination with same manufacturers sag resistant ceiling panels. Ceiling panels to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects. Suspension systems shall not incur 50 percent red rust as defined by ASTM B117 test during the period of the warranty, extra materials.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to site in original, unopened packages and store in a fully enclosed, conditioned space protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, allow panels to attain room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufacturers are subject to compliance with requirements; provide ceiling panels and grid systems by one of the following:
 - 1. Concealed and Exposed Suspension Grid:
 - a. Armstrong World Industries, Inc.
 - b. CertainTeed Corporation.
 - c. Chicago Metallic; Rockfon (Roxul Inc.).
 - d. Hunter Douglas.
 - e. USG Interiors.
 - 2. Acoustical Ceiling Panel:
 - a. Armstrong World Industries, Inc.
 - b. CertainTeed Corporation.
 - c. Rockfon (Roxul Inc.).
 - d. Tectum Inc.
 - e. USG Interiors.
 - 3. Molding and Edge Trim:
 - a. Armstrong World Industries, Inc.
 - b. CertainTeed Corp.
 - c. Chicago Metallic Corporation.
 - d. Fry Reglet Corporation.
 - e. Gordon, Inc.
 - f. USG Interiors, Inc.; Subsidiary of USG Corporation.
 - 4. Acoustical Sealant for Exposed and Concealed Joints:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - b. USG Corporation; SHEETROCK Acoustical Sealant.
 - 5. Acoustical Sealant for Concealed Joints:
 - a. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
 - b. Pecora Corporation; AIS-919.
- B. Acoustical Panel Colors and Patterns:
 - 1. Match appearance characteristics indicated for each product type:
 - a. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E1264 and not manufacturers' proprietary product designations, provide products selected by Architect that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.2 METAL SUSPENSION SYSTEM

- A. Metal Suspension System:

1. Direct hung metal suspension systems of types, structural classifications, and finishes indicated complying with applicable requirements in ASTM C635/C635M:
 - a. High Humidity Finish:
 - 1) Comply with ASTM C635/C635M requirements for Coating Classification for Severe Environment Performance where high humidity finishes are indicated.
 - b. Attachment Devices - Size for five times the design load indicated in ASTM C635/C635M, Table 1 Direct Hung, unless otherwise indicated. Comply with seismic design requirements:
 - 1) Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E488 or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency:
 - a) Type: Cast in place, postinstalled expansion or postinstalled bonded anchors.
 - b) Corrosion Protection: Carbon steel components zinc plated to comply with ASTM B633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
 - c) Corrosion Protection: Stainless steel components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
 - d) Corrosion Protection: Components fabricated from nickel copper alloy rods complying with ASTM B164 for UNS No. N04400 alloy.
 - 2) Power Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.
 2. Wire Hangers, Braces, and Ties:
 - a. Zinc Coated, Carbon Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 - b. Stainless Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
 - c. Nickel Copper Alloy Wire: ASTM B164, nickel copper alloy UNS No. N04400.
 - d. Size: Select wire diameter so its stress at three times hanger design load (ASTM C635/C635M, Table 1 Direct Hung) will be less than yield stress of wire, but provide not less than 0.106 inch (2.69 mm) diameter wire.
 3. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust inhibitive paint.
 4. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04 inch (1 mm) thick, galvanized steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation; with bolted connections and 5/16 inch (8 mm) diameter bolts.
 5. Hold Down Clips: Provide hold down clips spaced 24 inches (610 mm) o.c. on all cross tees in areas with exterior opening larger than 48" x 96".
 6. Impact Clips: Provide impact clip system designed to absorb impact forces against acoustical panels in Gymnasiums.
 7. Aluminum cap for use over steel grid in kitchen areas or where shown on drawings or required.
- B. Metal Suspension Systems:
1. Wide Face, Steel Capped, Double Web, Steel Suspension System:
 - a. Main and cross runners roll formed from cold rolled steel sheet; prepainted, electrolytically zinc coated, or hot dip galvanized according to ASTM A653/A653M, not less than G30 (Z90) coating designation; with prefinished 15/16 inch (24 mm)

wide metal caps on flanges:

- 1) Structural Classification: Heavy duty system.
 - 2) Face Design: Flat, flush.
 - 3) Cap Finish: Color selected by Architect.
2. Narrow Face, Steel Capped, Double Web, Steel Suspension System:
- a. Main and cross runners roll formed from cold rolled steel sheet; prepainted, electrolytically zinc coated, or hot dip galvanized according to ASTM A653/A653M, not less than G30 (Z90) coating designation; with prefinished, cold rolled, 9/16 inch (15 mm) wide metal caps on flanges:
 - 1) Structural Classification: Intermediate-duty system.
 - 2) Face Design: Flat, flush.
 - 3) Cap Finish: Color selected by Architect.

2.3 ACOUSTICAL PANELS

- A. Acoustic Panel Type I: School Zone Fine Fissured No. 1713 by Armstrong World Industries.
1. Basis of Design Product:
 2. Classification - Provide panels complying with ASTM E1264 for type, form, and pattern:
 - a. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
 - b. Pattern: CE (perforated, small holes and lightly textured).
 3. Color: White.
 4. LR: Not less than 0.85.
 5. NRC: Not less than 0.70.
 6. CAC: Not less than **35**.
 7. Edge/Joint Detail: Square.
 8. Thickness: 3/4 inch (19 mm).
 9. Modular Size: 24 by 24 inches (610 by 610 mm).
 10. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273 and evaluated according to ASTM D3274 or ASTM G21.

2.4 MOLDING, TRIM AND ACCESSORIES

- A. Shadow Molding: Where an acoustical lay in ceiling abuts a gypsum board ceiling in the same plane, provide a "W" shaped reveal or "shadow" molding similar to Armstrong Shadow Molding No. 7873.
- B. Light Fixture Protection:
1. Manufacturer: Thermafiber Light Protection Kit by Owens Corning or Type 5/8 or 3/4 P(S) by Armstrong World Industries.
 2. Fire Resistance Rating: Same as ceiling assembly rating.
 3. Locations: At fixtures reinstalled in fire rated ceiling assemblies.
- C. Roll Formed, Sheet Metal Edge Moldings and Trim:
1. Type and profile for standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color used for exposed flanges of suspension system runners:
 - a. Provide edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
 - b. For lay in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - c. For circular penetrations of ceiling, provide edge moldings fabricated to diameter

required to fit penetration exactly.

- D. Extruded Aluminum Edge Moldings and Trim:
 - 1. Where indicated, provide extruded aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
 - a. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B221 for Alloy and Temper 6063-T5.
 - b. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
 - c. Baked Enamel or Powder Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C635/C635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
- E. Acoustical Sealant:
 - 1. Comply with ASTM C834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90:
 - a. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
 - b. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

- A. Environmental Limitations:
 - 1. Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use:
 - a. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

3.2 EXTRA MATERIALS

- A. Furnish extra materials matching products installed and packaged with protective covering for storage and identified with labels describing contents:
 - 1. Acoustical Ceiling Panels: Full size panels equal to 2 percent of quantity installed.
 - 2. Suspension System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
 - 3. Hold Down Clips: Equal to 2 percent of quantity installed.
 - 4. Impact Clips: Equal to 2 percent of quantity installed.

3.3 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut for compliance with requirements specified that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

- C. Proceed with installation after correcting unsatisfactory conditions.

3.4 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less than half width panels at borders, and comply with layout shown on reflected ceiling plans.

3.5 INSTALLATION

- A. Install acoustical panel ceilings to comply with ASTM C636/C636M and seismic design requirements indicated, according to manufacturer's written instructions and *CISCA Ceiling Systems Handbook*:
 1. Fire Rated Assembly: Install fire-rated ceiling systems according to tested fire rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers where required and, if permitted with fire resistance rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast in place hanger inserts, postinstalled mechanical or adhesive anchors, or power actuated fasteners that extend through forms into concrete.
 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast in place or postinstalled anchors.
- D. Panel Accessibility: Install panels downward accessible by disengaging hinge support rail on one side of panel from the T Bar Flange or optional A Mount rail flange without the use of tools, for access without removal of panel from the ceiling.

- E. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels:
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- F. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit:
 - 1. Arrange directionally patterned acoustical panels with pattern running in one direction parallel to long axis of space.
 - 2. For square edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 - 3. For reveal edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 - 4. For reveal edged panels on suspension system members with box shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
 - 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
 - 6. Install hold-down clips in areas indicated, in areas with exterior opening larger than 48" x 96", where required by authorities having jurisdiction, and for fire resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.
 - 7. Install clean room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.
 - 8. Protect lighting fixtures and air ducts to comply with requirements indicated for fire resistance rated assembly.

3.6 FIRE RATING SCHEDULE

- A. Refer to UL Assemblies Drawings for Fire Rating requirements of ceiling materials at rated floor and roof assemblies.

3.7 FIELD QUALITY CONTROL

- A. Special Inspections:
 - 1. Engage a qualified special inspector to perform the following special inspections:
 - a. Compliance of seismic design.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations show compliance with requirements:
 - 1. Extent of Each Test Area:

- a. When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed:
 - 1) Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
 - 2) When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.8 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 00

SECTION 09 65 13.13 RESILIENT BASE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements including but not limited to:
 - 1. Rubber base.
 - 2. Accessories necessary for a complete installation.

1.3 SUBMITTALS

- A. Product Data: Technical data for each type of product including manufacturer's installation instructions.
- B. Samples: Sample of Base Selected or Color Chart if none selected.
- C. Maintenance Data: Submit for inclusion in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Entity having minimum 5 years documented experience who employs workers competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store base and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F (10 degrees C) or more than 85 degrees F (29 degrees C). Store floor tiles on flat surfaces.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Basis of Design Product:
 - 1. Manufacturers and tile series, pattern, and color selections are indicated in the Finish Schedule and are a basis of design. Subject to compliance with requirements, provide product indicated in Finish Schedule or comparable product by one of the following:
 - a. Flexco Floors.
 - b. Johnsite, a division of Tarkett Group.
 - c. Mannington Commercial.
 - d. Roppe.
- B. Rubber Base - ASTM F1861:
 - 1. Material: Rubber, vulcanized, Type TS, Group I, Styles A and B.
 - 2. Manufacturing Method: Group I (solid, homogeneous).
 - 3. Style: Topset cove; minimum 100 foot coil, cut to length required.

4. Minimum Thickness: 0.125 inch (3.2 mm).
 5. Color: Selected by Architect.
 6. Height: 4 inches, unless otherwise indicated on drawings.
 7. Outside Corners: Job formed.
 8. Inside Corners: Job formed.
- C. Adhesives: Water resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 EXECUTION

3.1 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 85 degrees F (29 degrees C), in spaces to receive floor tile during the following time periods:
1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F (13 degrees C) or more than 95 degrees F (35 degrees C).
- C. Close spaces to traffic for 48 hours after installation.

3.2 EXAMINATION

- A. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the work:
1. Verify that finishes of substrates comply with tolerances and other requirements specified for other work and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation after correcting unsatisfactory conditions. Installation of resilient flooring and accessories indicates acceptance of surfaces and conditions.

3.3 PREPARATION

- A. Immediately before installation, sweep clean substrates to be covered by resilient base.

3.4 INSTALLATION

- A. Comply with manufacturer's written instructions for installing flooring. Scribe and cut flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Extend flooring into toe spaces, door reveals, closets, and similar openings.
- B. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- C. Resilient Base:
1. Comply with manufacturer's written instructions for installing resilient base. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and

other permanent fixtures in rooms and areas where base is required:

- a. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- b. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- c. Do not stretch resilient base during installation.
- d. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- e. Preformed Corners: Install preformed corners before installing straight pieces.
- f. Job Formed Corners:
 - 1) Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - 2) Form without producing discoloration (whitening) at bends.
 - 3) Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length:
 - a) Miter or cope corners to minimize open joints.

END OF SECTION 09 65 13.13

SECTION 09 65 23 LUXURY VINYL TILE FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes requirements limited to:
 - 1. Luxury vinyl floor tile.
 - 2. Accessories necessary for a complete installation.
- B. Related Sections:
 - 1. Section 03 30 00: Cast-In-Place Concrete.
 - 2. Section 09 65 13.13: Resilient Base.

1.3 SUBMITTALS

- A. Product Data: Technical data for each type of product including manufacturer's installation instructions.
- B. Shop Drawings - For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built in furniture, cabinets, and cutouts:
 - 1. Show details of special patterns.
- C. Samples - Full size units of each color and pattern of floor tile required:
 - 1. Luxury Vinyl Tile (LVT) flooring: 18 inch by 18 inch (460 mm by 460 mm) tile in each color selected and 12 inch long piece of base material in each color selected for approval.
- D. Product Schedule: Submit for floor tile using same designations indicated on Drawings.
- E. Maintenance Data: Submit for inclusion in maintenance manuals.
- F. Reports: Certified Moisture Testing Results.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Fire Test Response Characteristics - For resilient tile flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency:
 - a. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
 - b. Smoke Density: Maximum specific optical density of 450 per ASTM E662.
 - 2. Accessibility Requirements - Comply with applicable requirements:
 - a. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG).
 - b. 2010 ADA regulations.
 - c. 2019 CBC Section 11B-302.1.
- B. Installer Qualifications: Entity having minimum 5 years documented experience who employs workers competent in techniques required by manufacturer for floor tile installation

and seaming method indicated.

- C. Contractor is required to achieve the specified concrete moisture content prior to installation of all flooring materials or use a flooring manufacture approved moisture barrier prior to installation of all flooring products. Contractor shall provide certified moisture testing results per ASTM F2170 (*Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes*) to Architect and Owner prior to floor installation. Acceptable moisture content of concrete sub floor shall be within approved manufacture limits or lower prior to installation.
- D. Source Limitations:
 - 1. Tile: Obtain floor products of same type and color or finish from one source or producer. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
 - 2. Setting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

1.5 WARRANTY

- A. Warrant the Work specified herein for ten (10) years against becoming unserviceable or causing an objectionable appearance resulting from either defective, or nonconforming materials and workmanship.
- B. Defects shall include, but not be limited to, the following:
 - 1. Damaged tile, including broken or chipped edges.
 - 2. Loose or missing tile.
 - 3. Noticeable deterioration or discoloring of tile or grout.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F (10 degrees C) or more than 85 degrees F (29 degrees C). Store floor tiles on flat surfaces.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Basis of Design Product:
 - 1. Manufacturers and tile series, pattern, and color selections are indicated in the Finish Schedule and are a basis of design. Subject to compliance with requirements, provide product indicated in Finish Schedule or comparable product by one of the following:
 - a. Luxury Vinyl Tile (LVT):
 - 1) Basis of Design: **LVT, OFCI.**
- B. Trowelable Leveling and Patching Compounds: Latex modified, portland cement based formulation provided or approved by floor tile manufacturer for applications indicated.
- C. Adhesives: Water resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- D. Floor Polish: Provide protective, liquid floor polish products recommended by floor tile manufacturer.

PART 3 EXECUTION

3.1 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 85 degrees F (29 degrees C), in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F (13 degrees C) or more than 95 degrees F (35 degrees C).
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Where demountable partitions, cabinets, and similar items are indicated for installation on top of resilient tile flooring, install tile before these items are installed.
- F. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.
- G. Install flooring after other finishing operations, including painting, have been completed.

3.2 EXTRA STOCK

- A. Furnish extra materials matching products installed and packaged with protective covering for storage and identified with labels describing contents:
 - 1. LVT Flooring: 1 percent of quality installed or 2 full unopened containers, whichever is greater.

3.3 EXAMINATION

- A. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work:
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified for other Work and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation after correcting unsatisfactory conditions. Installation of resilient flooring and accessories indicates acceptance of surfaces and conditions.

3.4 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates - Prepare according to ASTM F710:
 - 1. Verify substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended

- by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 4. Moisture Testing - Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F2170. Proceed with installation only after substrates have a maximum **95** percent relative humidity level.
 5. Bond Test: Bond 3' x 3' panels spaced 50 feet apart throughout subfloor area. After moisture test proves floor acceptably dry, install panels using adhesive. If panels are securely bonded after 72 hours, subfloor is sufficiently clean of foreign materials for satisfactory installation of resilient flooring.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are the same temperature as the space where they are to be installed:
 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.5 INSTALLATION

- A. Comply with manufacturer's written instructions for installing flooring. Scribe and cut flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Extend flooring into toe spaces, door reveals, closets, and similar openings.
- B. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- C. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one/half tile at perimeter:
 1. Lay tiles square with room axis.
- D. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles:
 1. Lay tiles with grain running in one direction.
- E. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built in furniture, cabinets, pipes, outlets, and door frames.
- F. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor

tiles to center of door openings.

- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- H. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- I. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- J. Floor Tile - Comply with manufacturer's written instructions for installing floor tile:
 - 1. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter:
 - a. Lay tiles square with room axis unless pattern indicated for an area.
 - 2. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles. Lay tiles with grain running in one direction.
- K. Resilient Accessories - Comply with manufacturer's written instructions for installing resilient accessories:
 - 1. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.6 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish. Apply two coat(s).
- E. Sealers and Finish Coats:
 - 1. Remove soil, visible adhesive, and surface blemishes from resilient terrazzo floor tile surfaces before applying liquid cleaners, sealers, and finish products:
 - a. Sealer: Apply two base coats of liquid sealer.
 - b. Finish: Apply two coats of liquid floor finish.
- F. Cover floor tile until Substantial Completion.
- G. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products

according to manufacturer's written recommendations:

1. Before cleaning, strip protective floor polish.
2. Reapply polish to floor surfaces to restore protective floor finish according to flooring manufacturer's written recommendations.

END OF SECTION 09 65 23

SECTION 09 90 00 PAINTING AND COATING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements including but not limited to:
 - 1. Surface preparation and field painting of exposed items and surfaces.
 - 2. Field preparation and painting of factory primed metal products and fabrications.
 - 3. Accessories necessary for a complete installation.
- B. Related Sections (Including but not limited to):
 - 1. Section 06 10 00: Rough Carpentry.
 - 2. Section 09 21 16: Gypsum Board Assemblies.

1.3 DEFINITIONS

- A. Standard coating terms defined in ASTM D16 apply:
 - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 - 2. Eggshell refers to low sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 - 3. Satin refers to a slightly higher sheen than eggshell and more reflective and durable finish and is less lustrous than semi-gloss.
 - 4. Semigloss refers to medium sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 - 5. Full gloss refers to high sheen finish with a gloss range more than 70 when measured at a 60-degree meter

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit technical data and information for block fillers, primers, paints, and coatings, including label analysis and instructions for handling, storing, and applying each coating material proposed for use:
 - a. Indicate manufacturer's instructions for special surface preparation procedures, substrate conditions requiring special attention.
 - b. Material List: Provide inclusive list of required coating materials. Indicate each material and cross reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number, series, and general classification.
- B. Samples:
 - 1. Submit for each type of paint system and in each color and gloss of topcoat:
 - a. Provide stepped samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
 - b. Provide list of material and application for each coat of each sample. Label each sample as to location and application.

- c. Submit samples on following substrates for review of color and texture only:
 - 1) Concrete: Provide two 4-inch square samples for each color and finish.
 - 2) Concrete Masonry: Provide two 4" x 8" samples of masonry, with mortar joint in the center, for each finish and color.
 - 3) Painted Wood: Provide two 12-inch square samples of each color and material on hardboard.
 - 4) Ferrous and Nonferrous Metals: Provide two 4-inch square samples of flat metal and two 8-inch-long samples of solid metal for each color and finish.
- C. Product List: Submit product list of each paint system, color, and location of application. Use same product and location designations indicated in Finish Schedule.
- D. Coating **Maintenance Manual**: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as **Sherwin-Williams "Custodian Project Color and Product Information"** report or equal. Manual shall include an Area Summary with Finish Schedule, Area Detail designating where each product/color/finish was used, including product data pages, Manual Safety Data sheets, care and cleaning instructions, touchup procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
 1. Comply with Federal and local toxicity and air quality regulations and with Federal requirements on content of for heavy metals, including but not limited to, lead and mercury. Do not use solvents in paint products that contribute to air pollution.
 2. Comply with CARB suggested control measures using the Method 24 analysis.
 3. Performance and Durability:
 - a. ASTM D16 – "Standard Test Method for Load Testing Refractory Shapes at High Temperatures."
 - b. ASTM D2486 – "Standard Test Method for Scrub Resistance of Interior Wall Paint."
 - c. ASTM D2805 – "Standard Test Method for Hiding Power of Paints by Reflectometry."
 - d. ASTM D4828 – "Standard Test Method for Practical Washability of Organic Coatings."
 - e. ASTM D3363 – "Standard Test Method for Film Hardness by Pencil Test."
- B. Applicator Qualifications: A firm or individual having minimum 5 years documented experience in applying paints and coatings similar in material, design, and extent to those indicated.
- C. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1.6 WARRANTY

- A. Written warranty signed by the manufacturer and the installer in which the manufacturer and installer agree to repair or replace paint and primers that fail within specified warranty period:
 1. Failures include, but are not limited to, the following:
 - a. Flaking or delamination of paint with the substrate.
 - b. Rust, scale, similar imperfections due to improper surface preparation.
 - c. Thinning or watering of paint beyond that considered acceptable of paint manufacturer.
 - d. Failure to achieve dry film thickness (DFT) recommended by manufacturer for each coat in a paint system.

- e. Deterioration or loss of color of paint beyond normal weathering.
- 2. Warranty Period: One year from date of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F (7 degrees C):
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Basis of Specifications: **Sherwin Williams Company**: For product inquiries contact: Richard.condie@sherwin.com 916.267.3232
 - 1. Subject to compliance with requirements, provide first quality, 100% acrylic, commercial or industrial products of one of the specified manufacturers. Residential products are not permitted:

Substituted products must be equal to or better in quality than the Sherwin Williams products listed in Part 4.
 - a. Proprietary Names:
 - 1) Paint Schedule is based on a single manufacturer for convenience with exception to the paint used in specific areas where specialized coatings are required (Refer to Drawings).
 - 2) Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that named products are required to the exclusion of comparable products of specified manufacturers.
 - 3) Furnish product technical data, including per cent solids by weight and volume: (Method 24 analysis)
 - a) VOC content limits and emissions data.
 - b) Certificates of performance for comparable paint products of specified manufacturer.
 - 4) Use MPI index to coordinate performance based
 - b. Paint Products:
 - 5) Sherwin-Williams Co.
 - 6) PPG Industries, Inc.
 - 7) Dulux; Theater Black (Where applicable, see Drawings)
- B. Material Compatibility: Provide each paint system including block fillers, primers, and finish coats, that are compatible with one another and with substrates indicated under conditions of service and application, demonstrated by manufacturer based on testing and field experience.
- C. Material Quality: Provide manufacturer's best quality commercial paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint material containers not displaying manufacturer's product identification will not be acceptable. Residential quality paint products are not permitted.
- D. Chemical Components of Interior Paints and Coatings:
 - 1. Provide products complying with limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

- a. 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).
 - b. Restricted Components: Paints and coatings shall not contain components restricted by the EPA.
- E. Accessories: Materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- F. Patching Materials: Latex filler compatible with paint systems.
- G. Fastener Head Cover Materials: Latex filler.
- H. Theater Black: No Exceptions or alternates.

2.2 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials:
- 1. Owner reserves the right to invoke to engage the services of a qualified testing agency to sample paint materials:
 - a. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to site, samples may be taken at the site. Samples will be identified, sealed, and certified by testing agency.
 - b. Testing agency will perform tests for compliance with product requirements.
 - c. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 EXECUTION

3.1 FIELD CONDITIONS

- A. Apply waterborne paints when temperatures of surfaces to be painted and surrounding air are between 50 degrees F and 90 degrees F (10 degrees and 32 degrees C).
- B. Do not thin or add water to waterbased paints, including waterbased alkyds.
- C. Weather Conditions:
- 1. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
 - 2. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 degrees F (3 degrees C) above dew point; or to damp or wet surfaces.
 - 3. Minimum Application Temperatures for Water based Paints: Between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C).
- D. Apply solvent thinned paints when temperatures of surfaces to be painted and surrounding air are between 45 degrees F and 95 degrees F (7 degrees F and 35 degrees C):
- 1. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.
 - 2. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer during

application and drying periods.

- E. Provide lighting level of 80-foot candles (860lx) measured midheight at substrate surface.
- F. Labels: Do not paint over Underwriters Laboratories, Factory Mutual, other code required labels, or equipment name, identification, performance rating, or nomenclature plates.

3.2 EXTRA MATERIALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents:
 - 1. Paint: 2 percent, but not less than 1 gallon (3.8 L) of each material and color applied.

3.3 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for maximum moisture content and conditions affecting performance of the work.
- B. Test substrates after repairing and cleaning substrates but prior to application of paint and coatings:
 - 1. Maximum moisture content of substrates, when measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Fiber Cement Board: 12 percent.
 - c. Masonry (Clay and CMUs): 12 percent.
 - d. Wood: 15 percent.
 - e. Gypsum Board: 12 percent.
 - f. Plaster: 12 percent.
 - 2. Test cementitious and plaster cement/stucco for alkalinity (pH).
- C. Gypsum Board Substrates: Verify joints are taped and finishing compound is sanded smooth.
- D. Plaster Substrates: Verify plaster has fully cured. Verify existing plaster is in good condition and can receive new paint coating.
- E. Spray Textured Ceiling Substrates: Verify surfaces are dry.
- F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers:
 - 1. Verify previously painted surfaces can be stripped to bare substrate, repaired if necessary, and prepared to receive new paint system consisting of primer and two top coats at a minimum:
 - a. Note: If previously painted surfaces have failed to accept new paint systems, determine cause of failure and take corrective measures to ensure each surface accepts new paint system. Failure of new paint system is not permitted.
- G. Commence paint and coating application after correcting unsatisfactory conditions and surfaces are dry. Application of coating indicates applicator's acceptance of surfaces and conditions.

3.4 ITEMS TO RECEIVE PAINT

- A. Generally, all new items that are normally painted in any typical building, including but not

limited to the following list:

1. All ferrous metal
 2. All exterior galvanized metal
 3. All exterior wood
 4. All interior wood
 5. All prime coated hardware
 6. All exposed pipe, plumbing, ductwork, conduit, outlet boxes and electrical cabinets, excluding those located in mechanical rooms.
 7. All metal grilles, except aluminum, unless otherwise indicated.
 8. All exposed gypsum board surfaces, including all mechanical rooms.
 9. Miscellaneous other items which normally require painting or are scheduled to be painted.
 10. Consult plans, finish schedule, details, and specifications for other trades, as all items usually field painted or finished will be considered as part of the Contract.
 11. All exposed mechanical equipment and electrical equipment.
 12. Traffic lanes and parking spaces including fire lanes and crosswalks.
 13. Rolling doors.
 14. Bollards.
 15. Loose lintels.
 16. Refer to MEP specifications for additional items to receive paint.
- B. All work where a coat of material has been applied must be inspected and approved by Architect before application of succeeding specified coat, otherwise no credit for coat applied will be given. Notify Architect when a particular coat has been completed for inspection and approval. Apply coats of material in strict accordance with manufacturer's specifications except where requirements of these specifications are in excess of manufacturer's requirements. Paint all sight exposed pipe and plumbing only after all mechanical work and tests have been completed.

3.5 PREPARATION

- A. Coordination of Work:
1. Review work in which primers are provided to ensure compatibility of the total system for various substrates. Notify Architect of anticipated problems when using materials specified over substrates primed by others:
 - a. Preprimed Substrates: Inspect existing conditions in which primers are factory applied to ensure compatibility of the total system for each substrate. Notify Architect of anticipated problems when using the materials specified over factory primed or preprimed substrates.
 - b. Existing Painted Surfaces: Inspect previously painted surfaces to ensure compatibility of the existing paints with new paint system for each substrate. Notify Architect of anticipated problems.
 - c. Correct defects and clean surfaces affecting bond with paint system. Remove existing paints exhibiting loose surface defects showing signs of rust, scale, or delamination.
 - d. Seal marks which may bleed through surface finishes.
- B. Surface Preparation:
1. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified. Provide barrier coats over incompatible primers or remove and reprime. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting:
 - a. Remove hardware and hardware accessories, plates, lighting fixtures, and similar items that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface

- preparation and painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- b. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface applied protection if any.
 - c. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - d. Clean and prepare surfaces to receive paint according to manufacturer's written instructions for each substrate condition and as specified. Provide barrier coats over incompatible primers, existing paint or coating, or remove and reprime.
 - e. Correct defects and clean surfaces affecting bond with paint or coating system. Remove existing coatings exhibiting loose surface defects. Seal marks which may bleed through surface finishes.
- C. **Cleaning:**
1. Before applying paint or surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and contaminants from the cleaning process will not fall on wet, newly painted surfaces:
 - a. Remove incompatible primers, including factory applied primers, and reprime substrate with compatible primers or apply barrier coat as necessary to produce paint systems indicated.
 - b. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
 - c. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
 - d. Galvanized Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
 - e. Aluminum Substrates: Remove surface oxidation.
 2. Power Washing:
 - a. **Loxon Self cleaning Acrylic:**
 - 1) **1 Coat Loxon LX02 Masonry Primer**
 - 2) **2 coats Loxon Self Cleaning Acrylic LX13-50**
- D. **Mildew and Mold Removal:** Remove mildew and mold by high power washing (pressure range of 1500 to 4000 psi) with solution of trisodium phosphate and bleach. If substrate is too soft for high power washing, scrub substrate with solution. Rinse with clean water and allow surface to dry.
- E. **Protective Coverings:** Provide protections for duration of the work, including covering furnishings and decorative items. Protect and mask adjacent finishes and components against damage, marking, overpainting, and injury. Clean and repair or replace damage caused by painting.
- F. **Renovated Surfaces:**
1. Clean surface free of loose dirt and dust. Except at gypsum board surfaces, remove existing paint and coatings to bare substrate and prepare substrates to receive new paint system. Test substrate to verify it will bond with primer and receive new paint system without failure. If test fails, clean surface to base substrate and apply barrier coat. Retest to verify surface will accept new paint system:
 - a. Remove surface film preventing proper adhesion and bond.
 - b. Wash glossy paint with a solution of sal soda and rinse thoroughly.
 - c. Remove loose, blistered, and defective paint and varnish; smooth edges with sandpaper.
 - d. Clean corroded iron and steel surfaces.

- e. Repair and blend into portland cement plaster.
 - f. Prime bare surfaces.
 - g. Tone varnished surfaces with stain bringing to uniform color.
 - h. If existing surfaces cannot be put in acceptable condition for finishing by customary cleaning, sanding, and puttying operations, notify Owner and do not proceed until correcting unsatisfactory conditions.
- G. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Wood Substrates:
- 1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - 2. Sand surfaces that will be exposed to view and dust off.
 - 3. Prime, stain, or seal wood to be painted. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
 - 4. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 - 5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- I. Barrier Coat: Provide barrier coats over incompatible primers or remove and reprime. Notify Owner in writing of anticipated problems using specified finish coat material over previously coated substrates.
- J. Material Preparation:
- 1. Mix and prepare paint materials according to manufacturer's written instructions:
 - a. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 - b. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 - c. Do not use thinners for water-based paints.
 - d. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.6 APPLICATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated:
- 1. The term exposed surfaces includes areas visible when permanent or built in fixtures, grilles, convector covers, covers for finned tube radiation, and similar components are in place. Extend coatings in these areas to maintain system integrity and provide desired protection.
 - 2. Use applicators and techniques suited for paint and substrate indicated.
 - 3. Provide finish coats compatible with primers.
 - 4. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 5. Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces:
 - a. Field painting of exposed surfaces include bare and covered pipes and ducts

- (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory applied final finish.
- b. Areas visible when permanent or built in fixtures, grilles, convactor covers, covers for finned tube radiation, and similar components are in place.
 - c. Extend coatings in areas, as required, to maintain system integrity and provide desired protection.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 8. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 9. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 10. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or surface imperfections. Cut in sharp lines and color breaks.
 11. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 12. Provide finish coats compatible with primers used.
 13. Sand lightly between each succeeding enamel or varnish coat.
- B. Items not to Receive Paint: Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
- C. Applicators:
1. Apply paints and coatings by brush, roller, spray, or applicators recommended by manufacturer:
 - a. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 - b. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool recommended by manufacturer for material and texture required.
 - c. Spray Equipment: Use airless spray equipment with orifice size recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness:
1. Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer:
 - a. Measure film thickness on magnetic surfaces by use of Elcometer thickness gauge and on nonmagnetic surfaces by pit gauge or Tooke Gauge.
- E. Application:
1. Apply first coat to surfaces that have been cleaned, pretreated, or prepared for painting as soon as practicable after preparation and before subsequent surface deterioration:
 - a. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
 - b. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished after removing rust and scale and priming or touching up surface sand if acceptable to topcoat manufacturers.
 - c. If undercoats, stains, or conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special

attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.

- d. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried and cured to where it feels firm and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

F. Mechanical and Electrical Work:

1. Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces:
 - a. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - b. Prime and paint uninsulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, heat exchangers, tanks, ductwork, conduit, switchgear, and paintable insulation except where items are prefinished.
 - c. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
 - d. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 - e. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
 - f. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
 - g. Concealed Members: Wherever steel and metal parts to receive paint are built into and concealed by construction, paint as specified for exposed parts so finish painting is complete before members are concealed.

G. Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Painting is limited to items exposed in equipment rooms and occupied spaces:
 - a. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - b. Prime and paint uninsulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, heat exchangers, tanks, ductwork, conduit, switchgear, and paintable insulation except where items are prefinished.
 - c. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
 - d. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 - e. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
 - f. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

H. Electrostatic Spray Painting:

1. Apply coating electrostatically to finished surfaces, free from runs, sags, visible overlaps, holidays, craters, pinholes and other defects detrimental to protective and decorative qualities of coating:

- a. Thickness of Coatings: 1.5 to 2.0 mils dry film thickness. Measure dry film thickness with magnetic gauge.
 - b. Use application techniques, equipment, materials, and preparation procedures recommended by manufacturer.
- I. Block Fillers: Apply block fillers to concrete masonry block at rate to ensure complete coverage with pores filled.
- J. Prime Coats: Before applying finish coats, apply prime coat, recommended by manufacturer, to material required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or defects due to insufficient sealing.
- K. Finish Coats:
1. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance without bleed through:
 - a. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or surface imperfections is not acceptable.
 - b. Transparent (Clear) Finishes: Use multiple coats to produce glass smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats.
- L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
- M. Touch Up:
1. Touch up marred, scraped, and blemished areas of surfaces which were factory primed or previously coated:
 - a. Prepare and touch up scratches, abrasions, and blemishes and remove foreign matter before proceeding with succeeding coats.
 - b. Touch up marred, scraped, and blemished areas of factory primed or previously coated surfaces.
 - c. Feather touch up coating overlapping minimum 2 inches onto adjacent unblemished areas producing smooth, uniform surface.
 - d. As soon after erection and installation as possible, touch up fasteners, welded surfaces and surroundings, field connections, and areas on which shop coat has been abraded or damaged with specified primer before corrosion and other damage occurs from exposure.

3.7 FIELD QUALITY CONTROL

- A. Dry Film Thickness (DFT) Testing:
1. Tests for dry film thickness may be determined by using a Tooke Scale and microgroover, an electronic scanner, or the Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness:
 - a. Contractor shall touch up and restore painted surfaces damaged by testing.
 - b. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with

paint manufacturer's written recommendations.

3.8 CLEANING AND PROTECTION

- A. It is of the utmost importance to the AISD that the site remains in a safe, clean, and well-maintained condition. At the end of each day, leave the site ready to use by staff and students. Protect staff and students and the learning environment throughout the work.
- B. Cleanup: At the end of each day, remove empty cans, rags, rubbish, and discarded paint materials from site. After completion of painting work, clean glass and paint splattered surfaces. Remove splattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. Provide Wet Paint signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After related work is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.
- E. At completion of painting activities, touch up and restore damaged or defaced painted surfaces.
- F. Waste Management: Legally dispose of unused paint and paint containers in accordance with manufacturer's recommendations and environmental regulations.

PART 4 SCHEDULES

- A. The following is a schedule of typical painted items and does not specifically include every item that is to receive paint but should establish type and quality of finish for all items normally included in a complete paint job.
- B. Interior Surfaces:
 - 1. Gypsum Wallboard:
 - a. Primer: One (1) coat ProMar 200 Zero VOC Latex Primer (B28W2600).
 - b. Finish: Two (2) coats ProMar 200 Zero VOC Latex Eg-Shel (B20W2651 Series).
 - c. Alternate (high traffic areas):
 - 1) Primer: One (1) coat ProMar 200 Zero VOC Latex Primer (B28W2600).
 - 2) Finish: SW Scuff Tuff Waterbased Enamel S23 Series
 - 2. Wood (Painted):
 - a. Primer: Premium Wall and Wood Primer (B25W8111).
 - b. Finish: ProClassic Waterborne Semi-Gloss (B31 Series).
 - 3. Wood (Stained):
 - a. Stain: Minwax stain.
 - b. Finish (First Coat): Wood Classics Polyurethane Varnish (A67 Series).
 - c. Finish (Second Coat): Wood Classics Polyurethane Varnish (A67 Series).

END OF SECTION 09 90 00

SECTION 22 00 00 - GENERAL PLUMBING PROVISIONS

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- A. The foregoing General and Special Conditions shall form a part of this Division with the same force and effect as though repeated herein. The provisions of this Section shall apply to all the Sections of Division 22.

1.2 CODES AND REGULATIONS

- A. All work and materials shall be in full accordance with current rules and regulations of applicable codes and all California Amendments. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes. Should the drawings or specifications call for material or methods of construction of a higher quality or standard than required by these codes, the specifications shall govern. Applicable codes and regulations are:
1. California Code of Regulations – CCR:
 - a. Title 8, Industrial Relations.
 - b. Title 24, Building Standards.
 2. California Building Code – CBC.
 3. California Mechanical Code – CMC.
 4. California Plumbing Code – CPC.
 5. California Fire Code – CFC.
 6. California Green Building Code.
 7. American Gas Association – AGA.
 8. American National Standards Institute – ANSI.
 9. American Society of Heating, Refrigerating and Air Conditioning Engineers – ASHRAE.
 10. American Society of Mechanical Engineers – ASME.
 11. American Society for Testing and Materials – ASTM.
 12. American Water Works Association – AWWA.
 13. Cast Iron Soil Pipe Institute – CISPI.
 14. California Electrical Code – CEC.
 15. National Electrical Manufacturers Association – NEMA.
 16. National Fire Protection Association – NFPA.
 17. National Sanitation Foundation – NSF.
 18. Plumbing and Drainage Institute – PDI.
 19. Sheet Metal and Air Conditioning Contractors National Association – SMACNA.
 20. Underwriters' Laboratory – UL.
 21. Occupational Safety and Health Act - OSHA.
 22. California Assembly Bill 1953 (AB1953).
 23. ASCE 7-16, Chapter 13.

1.3 PERMITS AND FEES

- A. The Contractor shall take out all permits and arrange for all tests in connection with his work as required by local ordinances. All charges are to be included in the work. Permits for equipment connected to a particular system are to be considered as a part of the work included under each system; for example, permits for electric motor connection are part of electrical work, permits for domestic water or gas connections are part of plumbing work. All charges for service connections, meters, etc. by utility companies or districts shall be included in the work.

1.4 COORDINATION OF WORK

- A. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, fixtures, equipment, supports, etc. shall be carefully planned, prior to installation of any work, to avoid all interferences with each other, or with structural, electrical or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.

1.5 GUARANTEE

- A. Guarantee shall be in accordance with the General Conditions. These specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the Certificate of Guarantee shall be furnished to the Owner through the Engineer.

1.6 EXAMINATION OF SITE

- A. The Contractor shall examine the site, compare it with plans and specifications, and shall have satisfied himself as to the conditions under which the work is to be performed. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect on his part to make such an examination.

1.7 SUBMITTALS

- A. Submit shop drawings in accordance with Division 01.
- B. Shop Drawings: Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc. proposed for use on this project. Material and equipment shall not be ordered or installed until written review is processed by the Engineer. Any item omitted from the submittal shall be provided as specified without substitution. All shop drawings must comply with the following:
 - 1. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the specifications or on the drawings. Descriptive literature shall be current factory brochures and submittal sheets. Capacities shall be certified by the factory.
 - 2. All shop drawings shall be submitted at one time in a neat and orderly fashion in a suitable binder with title sheet including Project, Engineer and Contractor; Table of Contents; and indexed tabs dividing each group of materials or item of equipment. All items shall be marked with the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on the drawings.
 - 3. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be highlighted, circled, or underlined on the shop drawings. Calculations and other detailed data indicating how the item was selected shall be included for items that are not scheduled. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled, or detailed.
- C. Substitutions: Manufacturers and model numbers listed in the specifications or on the drawings represent the standard of quality and the features desired. Unless otherwise noted, alternate manufacturers may be submitted for review by the Engineer. Calculations

and other detailed data indicating how the item was selected shall be included. The Contractor shall assume full responsibility that substituted items or procedures will meet the specifications and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items.

- D. Review: Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment, and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept; that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. The Contractor shall agree that if deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed.

1.8 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Submit one electronic pdf copy for review and after approved submit three hard copies of the Operation and Maintenance Instructions and Wiring Diagrams for all equipment and parts lists for all equipment, etc. shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. WH-1). All wiring diagrams shall agree with revised shop drawings and indicate the exact field installation. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. Water Heaters, Pumps, Motors, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included.
- B. Verbal: The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The controls contractor shall present that portion of the instruction that applies to the control system. The Engineer's office shall be notified 96 hours prior to this meeting.
- C. Acknowledgment: The Contractor shall prepare a letter indicating that all operation and maintenance instructions (printed, verbal and posted) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the Engineer.

1.9 RECORD DRAWINGS

- A. The Contractor shall maintain a set of prints for the project as a record of all construction changes made. As the Work progresses, the Contractor shall maintain a record of all deviations in the Work from that indicated on the drawings. Final location of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, i.e. buildings, curbs and walks. In addition, the water, gas, sewer, etc. within the building shall be recorded by offset distances from building walls. The original drawings will be made available to the Contractor from which he shall have a set of reproducible drawings made. The Contractor shall then transfer the changes, notations, etc. from the marked-up prints to the reproducible drawings. The record drawings (marked-up prints and reproducibles) shall be submitted to the Engineer for review (as an alternative, the marked-up prints may be photocopied full size on reproducible stock).

PART 2 PRODUCTS

2.1 PROTECTIVE COATING FOR UNDERGROUND PIPING

- A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, X-Tru Coat, Scotchkote. All fittings and areas of damaged coating shall be covered with two layer double wrap of 10 mil polyvinyl tape to total thickness of 40 mils. Manville Corporation. Protective coating shall be extended 6" above surrounding grade.

2.2 SEISMIC RESTRAINTS

- A. All plumbing systems (all equipment, piping, etc.) shall be provided with seismic restraints in accordance with "Seismic Restraint Systems Guidelines" OPM-0052-13 by Eaton/ Tolco.

2.3 SYSTEM IDENTIFICATION

- A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by preprinted markers or stenciled marking, and include arrows to show the direction of flow. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floor, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portion of lines. Marking of short branches and repetitive branches for equipment connections is not required.
- B. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. WH-1). Provide 1/2" high lettering, white on black background. Nameplates shall be permanently secured to the unit.
- C. Valves: Provide valve tags on all valves of each piping system, excluding check valves, valves within equipment, faucets, stops and shut-off valves at fixtures and other repetitive terminal units. Provide brass tags or plastic laminate tags. Prepare and submit a tagged valve schedule, listing each valve by tag number, location, and piping service. Mount in glazed frame where directed.

2.4 EQUIPMENT SUPPORT FRAMES

- A. Unless specifically noted otherwise, it shall be the responsibility of Plumbing Contractor to furnish and install all support frames for its equipment.

PART 3 EXECUTION

3.1 SCHEDULING OF WORK

- A. All work shall be scheduled subject to the approval of the Engineer and Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site.

3.2 CONDUCT OF WORK

- A. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work contracted for as rapidly as possible consistent with good work and shall cause no delay to other Divisions engaged upon this project or to the Owner.

- B. Plumbing Contractor shall arrange for all cutting necessary for the proper installation of its work, providing all sleeves and chases necessary. Cutting shall not be done in such a manner to impair the strength of the structure. Any damage resulting from work shall be repaired by the Contractor at his expense to the satisfaction of the Engineer.
- C. Progressively, daily at the completion of each day's work, and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work.
- D. **IAQ Management plan will be in effect for Cal Green requirements. Adhesives and mastic must comply with low VOC requirements and documentation (MSDS, etc.) shall be provided with submittals.**

3.3 EXCAVATION AND BACKFILL

- A. Excavation: Trenches are to be excavated to grade and depth established by drawings. Unless otherwise noted, minimum earth cover above top of pipe shall be 24", not including base and paving in paved areas. Width of trenches at top of pipe shall be a minimum of 16" plus the outside diameter of the pipe. Provide all shoring required by site conditions. Barrel of pipe shall have uniform support on trench bottom, hand excavate additional depth at bells, hubs, and fittings. Where over-excavation occurs, provide compacted selected backfill to pipe bottom. Where ground water is encountered, remove to keep excavation dry, using well points and pumps as required.
- B. Backfill:
 - 1. Around Pipe and to One Foot Above Pipe: Material shall be river run sand or native granular free flowing material, free of clay lumps, silt or vegetable matter and shall have 100% passing through the No. 4 sieve and a maximum of 3% passing through the No. 200 sieve. Place carefully around and on top of pipe, taking care not to disturb piping. Consolidate with vibrator.
 - 2. One Foot Above Pipe to Grade: Material to be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed, to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to approval by the Engineer.
 - 3. Remove all water sensitive settlement from trench backfill regardless of location and compaction requirements.
- C. Compaction: Compact to a density of 95% within building and 90% outside building. Demonstrate proper compaction by testing at one-half of the trench depth. Perform three tests per 100' of trench.

3.4 OPENINGS, CUTTING AND PATCHING

- A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. The actual openings and the required cutting and patching shall be provided. Coring through existing concrete or masonry walls, floors, ceilings, foundations, footings, etc., and saw cutting of concrete floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Patching of these surfaces shall also be provided. Cutting and coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

3.5 MANUFACTURER'S RECOMMENDATIONS

- A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of a particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

3.6 QUIETNESS

- A. Piping and equipment shall be arranged and supported so that vibration is a minimum and is not carried to the building structure or spaces.

3.7 DAMAGES BY LEAKS

- A. The Contractor shall be responsible for damages to other work caused by leaks in the temporary or permanent piping systems prior to completion of work and during the period of the guarantee, and for damages to other work caused by disconnected pipes or fittings, and the overflow of equipment prior to completion of the work.

3.8 CLEANING

- A. Progressively and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work.

END OF SECTION 22 00 00

SECTION 22 00 01 - PLUMBING

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- A. The foregoing Section 22 00 00, General Plumbing Provisions shall form a part of this specification.

1.2 SCOPE

- A. Included: Perform all work necessary and required to complete construction as indicated. Such work includes the furnishings of all labor, materials, and services necessary for a complete, lawful, and operating plumbing system with all equipment as shown or noted on the drawings or as specified herein. The work includes, but is not necessarily limited to, the following:
 - 1. Sanitary sewer system.
 - 2. Domestic water system.
 - 3. Plumbing fixtures.
 - 4. Plumbing equipment.
 - 5. Gas piping.
- B. Work Specified Elsewhere:
 - 1. Line voltage power wiring (60 volts or greater), motor starters in motor control centers, and disconnect switches are included in the Electrical Division, unless otherwise noted.
 - 2. Access doors.
 - 3. Concrete and reinforcing steel.

1.3 CODES AND STANDARDS

- A. All pipe, pipe or plumbing fittings or fixture, solder, or flux shall be lead free that provides water for human consumption per California Assembly Bill 1953 (AB1953).
- B. See Section 22 00 00 for additional requirements.

1.4 SUBMITTALS

- A. Provide product data for all materials per Division 01.

PART 2 MATERIALS

2.1 PIPING MATERIALS

- A. Sanitary Sewer:
 - 1. Soil, Waste and Vent Piping:
 - a. Inside Building and Within Five Feet of Building Walls: Standard weight coated cast iron pipe and fittings. Plain end with neoprene gasket and stainless steel retaining sleeve, CISPI 301, ASTM A888 hubless cast-iron, or hub end with rubber gasket, ASTM A74, ASTM C564. Size 2" and smaller above grade may be standard weight galvanized steel, ASTM A53, with coated cast iron recessed drainage fittings, ANSI B16.12. All cast iron pipe and couplings shall be American made and tested, no imported pipe or coupling are acceptable. Use heavy-duty (4-Band) couplings for all soil and waste piping. Use standard (2-Band) couplings for all

- vent piping. Tyler Pipe, AB & I Foundry or Charlotte Pipe. Couplings shall be Tyler, Anaco or Husky.
2. Cleanouts: Floor cleanouts: Smith 4020 with nickel bronze top in finished areas; Smith 4220 in utility areas. Wall cleanouts: Smith 4530 with stainless steel cover and screw. Comparable models of Josam, Wade, Zurn or equal.
- B. Water and Gas:
1. Hot and Cold Water Piping:
 - a. Inside Building: Type L hard temper seamless copper, ASTM B88. Wrought copper fittings ANSI B16.22. Vacuum pipe shall have long sweeping elbow fittings. 95/5 tin-silver soldered joints. Brazesafe, Silcan or equal brazing material.
 2. Gas Piping:
 - a. Above Grade: Schedule 40 black steel pipe, ASTM A53. All gas pipe and couplings shall be American made and tested, no imported pipe or coupling are acceptable. 150 psi black malleable iron screwed fittings, ANSI B16.3, ANSI B31.8. Galvanized pipe and fittings will not be allowed. Flexible connections shall be convoluted brass with dielectric couplings, AGA approved. Outside building flexible connections shall be convoluted stainless steel with dielectric couplings, AGA approved. Prime and paint all piping.
- C. Valves and Specialties:
1. Valves:
 - a. General: Manufacturer's model numbers are listed to complete description. Milwaukee, Kitz, Apollo, Nibco, Stockham or equal. All valves shall be full size of upstream piping. **Ball valves shall be substituted for gate valves 2" and smaller. Butterfly valves shall be substituted for gate valves 2-1/2" and larger. Cv factors for ball valves shall not be less than equal size gate valves.**
 - b. Plug Valve: Eccentric bronze plug. Nickel chromium alloy iron body. Bronze bushings. Buna-N O-rings. UL approved for gas distribution. 175 psi WOG. DeZurick Series 400 or equal.
 - c. Ball Valves: Two or three piece construction, forged bronze body, chrome plated brass ball, threaded ends, teflon seats, PTFE or reinforced teflon stem seals, lever handle. Underground valves shall have "T" handle. Provide one operating "T" extension handle for all underground valves. Milwaukee BA100/150, BA300/350, Nibco or equal.
 - d. Gas Valves: 2" and smaller, Milwaukee BB2-100; 2-1/2" and larger, Rockwell #142 or equal.
 - e. Butterfly Valve: Iron Body, Aluminum bronze disk (connection to shaft shall not be by pins, screws, or bolts). Ductile body PPS coated with EPPM coated ductile disc. O-ring seals. Resilient removable seat. 416 stainless steel two piece shaft. 6" and smaller valves shall have multi-position lever handle. Underground valves shall have square operating nut. Provide one operating "T" handle for underground valves. Provide 2" extension neck at insulated pipes. Milwaukee "C" series, Kitz or equal.
 2. Miscellaneous Specialties:
 - f. Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi.
 - g. Dielectric Coupling: Insulating coupling rated for 250 psig. EPCO or equal.
 - h. Shock Absorbers: Sioux Chief "Hydra-Rester", Zurn "Shoktrol", PPP "SC Series" or equal.
- D. Miscellaneous Piping Items:
1. Pipe Support:
 - a. Pipe Hanger: Adjustable split ring, swivel hanger and rod. Black malleable iron. Size and maximum load per manufacturer's recommendation. Felt lined, B-Line B3690F, Unistrut or equal.

- b. Construction Channel: 12 gage 1-5/8" x 1-5/8" steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Unistrut, Superstrut or equal.
2. Pipe Sleeves: 24 gage galvanized steel. Adjus-to-Crete #10 with #99 thimble for floors. #100 for walls.
3. Flashing: Vent flashing and flashing for piping through roof shall be prefabricated 24 gauge galvanized steel roof jacks with 8" square flange around pipe sealed with weatherproofing mastic.
4. All wall mount access panels shall have cylinder key lock. Ceiling access panels can be screwdriver latch.

2.2 PIPING INSULATION MATERIALS

- A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.
- B. Pipe Insulation: Elastomeric type, ASTM C534, with a thermal conductivity of 0.27 at 75°F when measured in accordance with ASTM C177 or ASTM C518.
 1. Wall thickness: 3/4 in.
 2. Adhesive: Conform to Manufacturer's recommendations.
- C. Pre-molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all-service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/hr-sq. ft-degrees F, at a mean temperature of 50 degrees F. Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For hot water piping, thickness shall be 1" for pipe sizes less than 2", 1-1/2" thickness for pipe sizes 2" and larger. CSG Insulation Corp., Manville, Owens-Corning or equal.
- D. Fiberglass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/hr sq. ft-degrees F, at a mean temperature of 50 degrees F. 1-1/2" thickness. Manville, Owens-Corning or equal.
- E. PVC Jacket (for exposed pipes and fittings): Pre-molded polyvinyl chloride (PVC) jackets. Size to match application. Provide PVC vapor barrier, pressure-sealing tape by same manufacturer. Zeston or equal.

2.3 FIXTURES

- A. General: This Division shall rough-in for and install all plumbing fixtures shown on drawings. All trim not concealed shall be brass with polished chromium plate finish unless otherwise noted. All enameled fixtures shall be acid resisting. Standard color is white unless otherwise noted.
- B. Schedule: Refer to Plumbing Fixture Schedule on the drawings for list of fixtures. Manufacturer's model numbers are listed to complete description. Water consumption quantities listed on schedule are maximum. Equivalent models of American Standard, Crane, Haws, Kohler, Eljer, Zurn or equal. For drainage fixtures, equivalent models of Josam, Smith, Wade, Zurn or equal.
- C. Stops and P-traps: All fixtures shall be provided with stops and p-traps as applicable.
 1. Stops: All hot and cold water supplies shall be 1/2" angle stops with IPS inlets and compression outlets, stuffing box, screwdriver lock shield, and 1/2" flexible brass tubing riser. Speedway. Wall mounted trim shall have concealed loose key wall stop. Chicago 1771 or equal.

2. P-traps: Brass, ground joint. 17 gage. American Standard, California Tubuler or equal.
 - a. Trap primers shall be provided with ball valve and cylinder key-lock access panel for all floor drains and floor sinks. PPP, Inc. or equal.

2.4 EQUIPMENT

- A. General Requirements:
 1. General: These equipment specifications are to supplement the drawings. Refer to schedules on drawings for the specific equipment to be provided. Capacities shall be in accordance with the schedules shown on the drawings. Capacities are to be considered minimum.
 2. Dimensions: Equipment must conform to space requirements and limitations as indicated on the drawings and as required for operation and maintenance. Equipment will not be accepted that does not readily conform to space conditions.
 3. Ratings: Electrical equipment shall be in accordance with NEMA Standards and UL listed where applicable standards have been established.
 4. Basis of Design: Manufacturers and model numbers listed in schedules as the basis of design are intended to represent the standard of quality and the features desired.
 5. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
 6. Electrical:
 - b. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls not included in equipment package. Manual and magnetic starters shall have ambient compensating running over-current protection in all ungrounded conductors. Magnetic starters shall be manual reset. Controllers and other devices shall be in NEMA 3 or 12 enclosures as applicable.
 - c. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts, and other devices shall be in ungrounded conductors.
 - d. Motors: Shall be rated, constructed, and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip-proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction. Design shall limit starting inrush current and running current to values shown on drawings.
 - e. Starters: Motor starters shall be provided for all equipment except where starter is in a motor control center as designated on the electrical drawings.
 - f. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.
 - g. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.
- B. Garbage Disposal: Unit shall have cover control, batch feed, with $\frac{3}{4}$ HP motor, stainless steel grinding elements with two stainless steel 360 degree swivel lugs. Include self-service wrench. In-Sink-Erator or approved equal.

PART 3 EXECUTION

3.1 PIPING INSTALLATION

A. General:

1. Piping Layout: Piping shall be concealed in walls, above ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Owner's Representative. No structural member shall be cut, notched, bored, or otherwise altered unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Expansion joints shall be installed as required. Vertical lines shall be installed to allow for building settlement without damage to piping. All exposed piping to be primed and painted, see painting section.
2. Joints:
 - a. Threaded: Pipe shall be cut square and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
 - b. Welded or Brazed: Filler rod shall be of the same suitable alloy as pipe. Welding or brazing shall be performed in accordance with requirements of recognized published standards of practice and by licensed or otherwise certified contractors. Welder or Brazer shall be a person who specialized in welding or brazing of pipes and holds a recognized certificate of competency from a recognized testing laboratory, based on the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.
 - c. Other: Joints other than threaded or welded shall be installed in accordance with manufacturer's recommendations.
 - d. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
 - e. Electrical Equipment: Joints shall be avoided, where possible, over electrical equipment.
 - f. Copper pipe 1-1/2" or less may be soldered. Above 1-1/2" and all below grade shall be brazed.
3. Fittings:
 - a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
 - b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
 - c. Unions: A union shall be installed on the leaving side of each valve, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.
 - d. Valves: All valves shall be full line size. At equipment connections, valves shall be full size of upstream piping.
4. Pipe Support:
 - a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Refer to drawings for additional requirements and attachment to structure. Vertical piping shall be supported at floor and ceiling. Support pipe within 12" of all changes in direction. Support individual pipes with pipe hanger. All pressure piping, drainage piping above grade and metallic piping of dissimilar metal from hangers shall have isolating shield, or felted hangers.

1) Screwed Pipe:

Pipe Size Between Supports*	Max. Spacing
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(in)	(ft)
1/2	6
3/4	8
1	8
1-1/4 & larger	10

* Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves, or other fittings.

- 2) Copper Tubing: Copper tubing shall be supported at approximately six (6) foot intervals for piping one and one-half (1-1/2) inches and smaller in diameter and ten (10) foot intervals for piping two (2) inches and larger in diameter.
 - 3) Gravity Drainpipe: Piping shall be supported at each length of pipe or fitting, but in no case at greater spacing than indicated above for pressure pipe.
 - b. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for approval.
 5. Excavation and Backfill: Minimum cover on all piping shall be as follows unless otherwise noted:
 - a. Up to 2-1/2" pipe - 24" cover.
 - b. 3" and larger pipe - 30".
 6. Miscellaneous:
 - a. Escutcheons: Provide chromium plated escutcheons where piping penetrates walls, ceilings, or floors in finished areas.
 - b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" clearance between sleeve and pipe or pipe insulation.
 - c. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined.
 - d. Shock Absorbers: Install per manufacturers recommendations.
- B. Sanitary Sewer Piping:
1. General: Where inverts are not indicated, sanitary sewer piping shall be installed at 1/4" per foot pitch. Piping 4" and larger may be installed at 1/8" per foot pitch where structural or other limitations prevent installation at a greater pitch.
 2. Cleanouts: Install cleanouts at ends of lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface. Cleanouts at urinals shall be installed above urinal.
 3. Vents: Vents shall terminate not less than 6" above the roof nor less than 12" from any vertical surface nor within 10 feet of any outside air intake. Install horizontal vent lines at 1/4" per foot pitch. Offset vents 2 feet minimum from gutters, parapets, ridges, and roof flashing.
- C. Water Piping: Connections to branches shall be made from the top side of the main. Supply header in fixture battery shall be full size to last fixture, reducing in size only on individual connections to each fixture in battery. Provide ball valve shutoff for each building and at each connection to equipment and trap primers. Shock absorbers shall be installed in a vertical position at end of branch runs as specified in this section whether specifically shown or not on drawings. Connections to equipment shall be made with flexible connectors.
- D. Gas Piping: Shall be pitched to drain to drip legs at each piece of equipment. No unions shall be installed except at connections to equipment. Provide shutoff at each equipment connection. Connections to equipment shall be made with flexible connectors. All exposed gas piping shall be primed and painted, see painting section.

3.2 PIPING INSULATION INSTALLATION

- A. Domestic Tempered Water Supply:
 - 1. General: All domestic tempered water supply piping, except for exposed connections to fixtures, shall be insulated. Do not insulate unions or valves less than 2", unless exposed to weather.
 - 2. Install elastomeric pipe insulation by slipping over end of pipe. Where not feasible, slit insulation longitudinally, snap over piping and seal with adhesive. Insulate fittings with larger diameter sleeves or insulation, lapping pipe insulation a minimum of 2 in.
 - 3. Butt sections of insulation tightly together and seal with adhesive to provide a continuous vapor and thermal barrier.
 - 4. Pipe: Apply pre-molded fiberglass sections to pipe using integral pressure sealing lap adhesive in accordance with manufacturer's recommendations. Stagger longitudinal joints. Seal butt joints with factory supplied sealing tape.
 - 5. Fittings and Valves:
 - a. Wrap fitting with pre-cut fiberglass blanket to thickness matching adjoining insulation. Cover blanket with PVC jacket in accordance with manufacturer's recommendations. Seal all joints with factory supplied pressure sealing vapor barrier tape with 2" (min.) overlap on both sides of joint. Insulate valves to stem.
 - b. For miscellaneous fittings for which PVC jackets are not available or where proximity of fittings precludes a neat-appearing installation, the contractor may cover the fiberglass blanket with stretchable glass fabric and at least two coats of vapor barrier coating. All exposed ends of insulation shall be adequately sealed.

3.3 FIXTURE INSTALLATION

- A. Fixture Height: Shall be standard height except those specified as ADA Compliant. Such fixtures shall be mounted in accordance with CBC, Section 11B, Division 6 and drawing details.
- B. Wall Hung Fixtures: Shall be provided with proper backing and hanger plates secured to wall. Fixtures mounted on carriers shall bear against stop nuts, clear of wall surface. Caulk fixtures against walls with white G.E. "Sanitary SCS1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).
- C. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.

3.4 EQUIPMENT INSTALLATION

- A. General: It shall be the responsibility of the equipment installer to ensure that no work done under other specification sections shall in any way block, or otherwise hinder the equipment.
- B. Connections to Equipment: Where size reductions are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

3.5 TESTS AND ADJUSTMENTS

- A. General: Unless otherwise directed, tests shall be witnessed by the Owner's Representative. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test, and repair his work, and that of other contractors, to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested. Tests may be made in sections. However, all connections between sections previously tested and new

section shall be included in the new test. New sections shall be isolated from existing sections for testing purposes. There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made. Test the new sections or branches of piping only.

- B. Gravity System:
 - 1. Sanitary Sewer: All ends of the new sections of sewer system shall be capped and lines filled with water to the top of the highest vent, 10 feet above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours.
- C. Pressure Systems:
 - 1. General: There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made. Test the new sections or branches of piping only.
 - 2. Domestic Tempered, Cold Water Piping: Maintain 60 psig water pressure for a minimum duration of 2 hours.
 - 3. Gas Piping: Maintain 60 psig air pressure for a minimum duration of 2 hours.

3.6 DISINFECTION

- A. Disinfect all domestic hot and cold water piping systems in accordance with California Plumbing Code Sections 609.9.1 through 609.9.4. The method to be followed shall be that prescribed by the Health Authority or, in case no method is prescribed by it, the following:
 - 1. The pipe system shall be flushed with clean, potable water until potable water appears at the points of outlet.
 - 2. The system or parts thereof shall be filled with a water-chlorine solution containing not less than 50 parts per million of chlorine, and the system or part thereof shall be valved-off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water-chlorine solution containing not less than 200 parts per million of chlorine and allowed to stand for 3 hours.
 - 3. Following the allowed standing time, the system shall be flushed with clean, potable water until the chlorine residual in the water coming from the system does not exceed the chlorine residual in the flushing water.
 - 4. The procedure shall be repeated where it is shown by bacteriological examination made by an approved agency that contamination persists in the system.
- B. Disinfection process shall be performed by certified testing agency or in cooperation with health department having jurisdiction and witnessed by a representative of the Architect. During procedure, signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, water samples shall be collected by certified testing agency or by health department for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained and delivered to the Owner through the Owner's Representative.

END OF SECTION 22 00 01

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

CONDITIONS OF THE CONTRACT AND DIVISION 01, as applicable, apply to this Section.

PART 1 GENERAL

1.1 SUMMARY

- A. Provide all work for electrical systems required in the project to be properly installed, tested, and performing their intended function.

1.2 QUALITY ASSURANCE

- A. Perform all work in accordance with the latest edition of the California Electrical Code.
- B. All electrical materials and distribution, and utilization equipment shall be UL Listed.
- C. All equipment and materials shall be new and unused and of United States Domestic manufacture unless approved otherwise by engineer or owner.
- D. Eliminate any abnormal sources of noise that are considered by the architect not to be an inherent part of the electrical systems as designed.

1.3 COORDINATION WITH OTHER TRADES

- A. Coordinate the work of this division with all other divisions to ensure that all components of the electrical system will be installed at the proper time and fit the available space.
- B. Locate and size all openings in work of other trades required for the proper installation of the electrical system components.
- C. Make all electrical connections to all equipment furnished by this division and any other division.
- D. Make all electrical connections from all 120 volt and greater dampers and switches to associated exhaust fan(s) furnished by any other division.

1.4 DRAWINGS

- A. The drawings are schematic in nature but show the various components of the systems approximately to scale and attempt to indicate how they are to be integrated with other parts of the building. Determine exact locations by review of equipment manufacturer's data, by job site measurements, by checking the requirements of other trades, and by reviewing all Contract Documents. The size of the electrical equipment indicated on the Drawings may be based on the dimensions of a particular manufacturer. While other listed manufacturers will be acceptable, it is the responsibility of the Contractor to determine if the equipment that Contractor proposes to furnish will fit in the space. The drawings are not intended to show exact locations of conduit and wire, or to indicate all wire terminators, connectors, conduit fittings, boxes or supports, but rather to indicate distribution, circuitry, and control.
- B. The Electrical Drawings are necessarily diagrammatic in character and cannot show every connection in detail or conduit in its exact location. These details are subject to the requirements of ordinances and also structural and architectural conditions. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate

trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases and suspended ceilings, etc., in finished portions of the building, unless specifically noted to be exposed. Work shall be installed to avoid crippling of structural members. All exposed work shall be installed parallel or perpendicular to the lines of the building unless otherwise noted.

- C. When the mechanical and electrical Drawings do not give exact details as to the elevation of pipe, conduit, and ducts, physically arrange the systems to fit in the space available at the elevations intended with the proper grades for the functioning of the system involved. Exposed conduit is generally intended to be installed true and square to the building construction and located as high as possible against the structure in a neat and workmanlike manner. The Drawings do not show all required offsets and their location details. Work shall be concealed in all finished areas.

1.5 SUBMITTALS

- A. Specification Review:
 - 1. Include a paragraph-by-paragraph written specification review for each product listed requiring a submittal. Denote any proposed deviations from specifications.

1.6 EXISTING CONDITIONS

- A. Do all work required to maintain electrical services to the Owner occupied portions of the building during construction.
- B. No connection to existing services or utilities shall be made without Owner's knowledge and permission. All such connections shall be planned and scheduled to minimize the length of service interruption required. Request for shutdown shall be made to Owner at least two (2) weeks in advance and shall be accompanied by detailed written schedule of activities during shutdown and list of materials required for connection and renewal of service. It shall be understood that all such service interruptions shall be made at the Owner's convenience, not the Contractor's. No increase in contract amount will be allowed for reasons of premium time, inefficiency of operations or other considerations not calculated in original bid.
- C. All items removed shall be stored on-site. Schedule a review of the items with the Owner. Remove from site all items the Owner does not choose to keep. Deliver Owner designated items to Owner's storage facility.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- B. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.
- C. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

PART 2 EXECUTION

2.1 EXISTING WORK

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

- B. Provide temporary wiring and connections to maintain existing systems in service during construction.
- C. When performing work on energized equipment or circuits, use personnel experienced and trained in similar operations.
- D. Remove, relocate, and extend existing installations to accommodate new construction.
- E. Repair adjacent construction and finishes damaged during demolition and extension work.

2.2 OWNER INSTRUCTION

- A. Provide on-site Owner training for all new equipment.
- B. Use Operation and Maintenance manuals and actual equipment installed as basis for instruction.
- C. At conclusion of on-site training program have Owner personnel sign written certification they have completed training and understand equipment operation. Include copy of training certificates in final Operation and Maintenance manual submission.
- D. Supply record drawings to the district in PDF and the latest version of AutoCAD.

END OF SECTION 26 05 00

SECTION 26 05 01 – SELECTIVE ELECTRICAL DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes:
 - 1. Electrical demolition.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work shall be as specified in individual sections.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Contractor to walk job to observe existing conditions and account for variance as needed.
- B. Verify field measurements and circuiting arrangements as shown on drawings.
- C. Verify that abandoned wiring and equipment serve only abandoned facilities.

3.2 PREPARATION

- A. Disconnect electrical systems as required under this contract.
- B. Coordinate work with the district. No demolition work shall begin without the district's approval.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, observe provisions of NFPA 70E and CALOSHA, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area as required.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted, or alternate arrangements have been made with owner (e.g. – Fire Watch). Disable system only to make switchovers and connections. Coordinate outages with Owner and local fire service. Notify Owner/Owner's representative at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to

maintain service in areas adjacent to work area.

- F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system to make switchovers and connections. Notify Owner at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of this section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Electrical Contractor is responsible for demolishing electrical materials and shall remove from the site and dispose properly or recycle.
- D. Remove abandoned wiring to source of supply.
- E. Remove exposed abandoned conduit. Cut conduit flush with walls and floors, and patch surfaces as required to match existing.
- F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- G. Disconnect and remove abandoned panelboards and distribution equipment.
- H. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- I. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- J. Discarded electrical components and lamps containing hazardous waste (i.e., mercury in fluorescent lamps) shall be disposed of as required by the State Laws and Local Ordinances regarding hazardous materials.
- K. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- L. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.4 INSTALLATION

- A. Install relocated and replacement materials and equipment as shown.

END OF SECTION 26 05 01

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:
 - 1. Wires and cables rated for 600 volts or less.
 - 2. Connectors, splices, and terminations rated for 600 volts or less.
 - 3. Lugs and pads rated for 600 volts or less.
- B. System Description:
 - 1. Provide wires, cables, connectors, lugs, strain reliefs, racking insulators for a complete and operational electrical system.
- C. Reference Standards:
 - 1. California Electrical Code (CEC). California Code of Regulations, Title 24, Part 3.
 - 2. National Electrical Manufacturers Association (NEMA):
 - a. WC 70 Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy.
 - 3. National Electrical Testing Association (NETA):
 - a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
 - 4. Underwriters Laboratories, Inc. (UL):
 - a. 83 UL Standard for Safety Thermoplastic-Insulated Wires and Cables.
 - b. 486 Standard for Wire Connectors.
 - 5. American Society for Testing and Materials (ASTM):
 - a. B1 Standard Specification for Hard-Drawn Copper Wire.
 - b. B3 Standard Specification for Soft or Annealed Copper Wire.
 - c. B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

1.3 SUBMITTALS

- A. Provide product data for the following equipment:
 - 1. Wires.
 - 2. Cables.
 - 3. Connectors.
 - 4. Lugs.
 - 5. Splice Kits.
- B. Provide the insulation cable testing report in the project closeout documentation, refer to Closeout Requirements in the General Conditions portion of this specification.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Confirm to requirements of the CEC, latest adopted version.
 - 2. Furnish products listed by UL or other testing firm acceptable to DSA.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wires and Cables:
1. Southwire Company
 2. Encore Wire Corporation
 3. Cerro Wire and Cable Co.
 4. General Cable Corp.; a brand of Prysmian Group
 5. Okonite Co.
 6. Alan Wire
 7. LS Cable and System USA
 8. American Wire and Cable
- B. Connectors:
1. FCI Burndy Corp.
 2. Cooper Crouse Hinds.
 3. O.Z./ Gedney Co.
 4. Thomas & Betts Co.
 5. 3-M Co.
 6. Ideal Industries Co.
 7. Polaris Electrical Connectors
 8. ILSCO
- C. Wire connectors shall be minimum 75 degree centigrade rated and properly sized for the number of conductors being connected, terminated, spliced etc. All above grade connectors shall be solderless lug or plastic wire nut type, screw on, pressure cable type (wire nut or spring nut type), 600 Volt, 105-degree C, with skirt to cover all portions of stripped wires. Connector shall be U.L. rated for number and size of conductors being joined together as a splice.
- D. Splices:
1. Branch Circuit Splices: Ideal, Scotch-Lock, 3M, or approved.
 2. Feeder Splices: Compression barrel splice with two layers Scotch 23 and four layers of Scotch 33+ as vapor barrier.
 3. Screw Terminal Lugs.
 4. Kearney Split Bolt.

2.2 WIRES AND CABLES FOR LINE VOLTAGE SYSTEM AND CONTROLS.

- A. Wire and Cable Shall Be:
1. Copper, 600 volt rated throughout. Conductors 12AWG to 10AWG, solid or stranded. Conductors 8AWG and larger, stranded.
 2. Phase color to be consistent at all feeder terminations; A-B-C, top to bottom, left to right, front to back. Phasing tape shall be permitted on sizes #6 and larger.
- B. Each phase wire shall be uniquely color-coded as indicated below:
1. 120/ 240 Volts
Phase A – Black
Phase B – Red
Neutral – White
Ground – Green
 2. 120/ 208 Volts
Phase A – Black
Phase B – Red
Phase C – Blue

- Neutral – White
 - Ground – Green
 - 3. 277/ 480 Volts
 - Phase A – Brown
 - Phase B – Orange
 - Phase C – Yellow
 - Neutral – White or Natural Gray
 - Ground – Green
 - 4. Isolated Grounds: Green with Yellow Stripes
- C. All conductors shall be copper unless otherwise noted. Minimum size for individual conductors shall be #12 AWG unless otherwise noted. Sizes #8 AWG and larger shall be stranded conductor. Individual conductors shall be insulated with type, XHHW, THW, THHN/ THWN 600- volt insulation unless otherwise noted. Control, signal, communication conductors shall be as dictated by the vendor of that equipment or as specified here-in. Proper insulation type shall be used for the proper environmental application (i.e., waterproof, wet location, plenum, temperature rated). If a condition exists where the application is uncertain, contact the Engineer for direction. Contractor is responsible to follow specific cabling requirements described in other sections of this specification relative to various communications and controls systems as well as the respective riser diagrams shown on plans. If a discrepancy occurs, communicate such discrepancy to the Architect and Engineer immediately for resolution.
- D. Insulation types THWN, THHN or XHHW. Minimum insulation rating of 90C for branch circuits.
- E. Refer to signal and communications specification sections for cable requirements.

2.3 CONNECTORS

- A. Copper Pads: Drilled and tapped for multiple conductor terminals.
- B. Lugs: Indent/ compression type for use with stranded branch circuit or control conductors.
- C. Solid Conductor Branch Circuits: Spring connectors, wire nuts, for conductors 12 through 8AWG.

2.4 LUGS AND PADS

- A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation: Conductors shall not be installed until after conduit systems are permanently in place. Use an approved non-hardening type wire pulling lubricant if lubricant is to be used. Maintain all conduits and wire pulls free from foreign material. If due to field conditions, more than a total of 300 degrees of bend are required; a pull box shall be furnished and installed for ease of installation. Said pull boxes must be sized and rated for the appropriate application and must remain easily accessible upon completion of the project (approval of the location shall be obtained from the Architect prior to installation). Show these pullboxes on the field record drawings. Conductors installed in underground raceways on site shall be duct sealed and taped where they exit the raceway to prevent the entrance of foreign

material and moisture after the conductors are installed. Proper drainage shall be provided for underground pull and splice boxes.

- B. Insulation: Use proper insulation types where temperature and environment are a factor.
- C. Labeling: All conductors in panels, switchboards, terminal cabinets, vaults, pull boxes, and junction boxes shall be labeled with tape number markers indicating circuit number and identifying system. All labeling shall be permanent. See Section 26 05 53: Identification of Electrical Systems.
- D. All conductors, wiring, cable where installed below floor, slab or underground shall be considered wet locations, and shall be rated accordingly. Non-waterproof cabling is not allowed in any below grade or wet application.
- E. Cables routed together in cable tray shall be stacked, organized and tie wrapped together in a neat and workman like manner. Random cable routing is not acceptable.
- F. Cable and conductors routed through pull boxes and vaults shall be properly supported. Bend radius of cable or conductor shall not be less than six times the overall cable diameter.
- G. Wires and Cables:
 - 1. Conductor Installation:
 - a. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
 - b. Install conductors with care to avoid damage to insulation.
 - c. Do not apply greater tension on conductors than recommended by manufacturer during installation.
 - d. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation.
 - 2. Conductor Size and Quantity:
 - a. Install no conductors smaller than 12AWG unless otherwise shown (e.g. – Fire alarm and communications systems, as defined in their respective specifications sections and/ or drawings).
 - b. Provide all required conductors for a fully operable system.
 - 3. Provide dedicated neutrals (one neutral conductor for each phase conductor). Exceptions may only be granted with Electrical Engineer approval.
 - 4. Conductors in Cabinets:
 - a. Cable and train all wires in panels and cabinets for power and control neatly and uniformly. Use plastic ties in panels and cabinets.
 - b. Tie and bundle feeder conductors in wireways of panelboards.
 - c. Hold conductors away from sharp metal edges.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and test shall be performed under provisions of NETA ATS section 7.3 (2) - Low Voltage Cables, 600-Volt Maximum as follows:
 - 1. Visual and Mechanical Inspection:
 - a. Compare cable data with drawings and specifications.
 - b. Inspect exposed sections of cable for physical damage and correct connection in accordance with single-line diagram.
 - c. Inspect all bolted electrical connections for high resistance using one of the following methods:
 - 1) Use of low-resistance ohm-meter in accordance with NETA section 7.3.2.2 (Electrical Tests).
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data from

NETA ATS Table 10.12.

- d. Inspect compression-applied connectors for correct cable match and indentation.
 - e. Verify cable color coding with applicable specifications and CEC.
2. Electrical Tests
- a. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute.
 - b. Perform resistance measurements through all bolted connections with low-resistance ohmmeter, if applicable, in accordance with Section 7.3.2.1 (Visual and Mechanical Inspection).
 - c. Perform continuity test to insure correct cable connection.
 - d. Correct malfunctions and/ or deficiencies immediately as detected at no additional cost to the District, including additional verification testing.
 - e. Subsequent to final wire and cable terminations, energize all circuitry and demonstrate functional adequacy in accordance with system requirements.
3. Test Values
- a. Compare bolted connection resistance to values of similar connections.
 - b. Bolt-torque levels should be in accordance with NETA ATS Table 10.12 unless otherwise specified by the manufacturer.
 - c. Micro-ohm or milli-volt drop values shall not exceed the high levels of the normal range as indicated in the manufacturer's published data. If manufacturer's data is not available, investigate any values which deviate from similar connections by more than 50 percent of the lowest value.
 - d. Minimum insulation-resistance values should not be less than 50 meg-ohms.
 - e. Investigate deviations between adjacent phases.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section Includes:
 - 1. Grounding and bonding requirements of electrical installations for personnel safety and to provide a low impedance path for possible ground fault currents as described in CEC Article 250.
 - 2. "Grounding electrode system" refers to all electrodes required by CEC, as well as including made, supplementary, lightning protection system and telecommunications system grounding electrodes.
 - 3. The terms "connect" and "bond" are used interchangeably in this specification and have the same meaning.
- B. Related Sections:
 - 1. Section 26 05 00: Common Work Results for Electrical.
 - 2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
- C. Reference Standards:
 - 1. California Electrical Code (CEC). California Code of Regulations, Title 24, Part 3.
 - 2. Institute of Electrical and Electronics Engineers (IEEE):
 - a. 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.
 - b. 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - c. 1100 Recommended Practice for Powering and Grounding Electronic Equipment
 - 3. National Electrical Testing Association (NETA):
 - a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems
 - 4. Underwriters Laboratories, Inc. (UL):
 - a. 83 UL Standard for Safety Thermoplastic-Insulated Wires and Cables.
 - b. 467 Grounding and Bonding Equipment.
 - 5. American Society for Testing and Materials (ASTM):
 - a. B1 Standard Specification for Hard-Drawn Copper Wire.
 - b. B3 Standard Specification for Soft or Annealed Copper Wire.
 - c. B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

- A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per CEC.

- B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes No. 10 AWG and smaller shall be ASTM B1 solid bare copper wire.
- C. Conductor sizes shall not be less than what is shown on the drawings and not less than required by the CEC, whichever is greater.

2.2 SPLICES AND TERMINATION COMPONENTS

- A. Components shall meet or exceed UL 467 and be clearly marked with the manufacturer, catalog number, and permitted conductor size(s).

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper; 3/4 inch by 10 feet (19 mm by 3 m).
- B. Ground Plates: 1/4 inch (6 mm) thick, hot-dip galvanized.
- C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes shall be at least 12 inches (300 mm) deep, with cover.
 - 1. Install at least one test well for each service unless otherwise indicated. Install the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

PART 3 EXECUTION

3.1 GENERAL

- A. Ground in accordance with the CEC, as shown on drawings, and as hereinafterspecified.
- B. System Grounding:
 - 1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
 - 2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.
- C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, fire sprinklers, plumbing piping, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

3.2 INACCESSIBLE GROUNDING CONNECTIONS

- A. Make grounding connections which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermicweld.

3.3 SECONDARY EQUIPMENT AND CIRCUITS

- A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.
- B. Metallic Piping, Building Steel, and Supplemental Electrode(s):
 - 1. Provide a grounding electrode conductor sized per CEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.

2. Provide a supplemental ground electrode and bond to the grounding electrode system.
- C. Service Disconnect: Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.
- D. Switchgear, Switchboards, and Motor Control Centers:
 1. Connect the various feeder equipment grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
 2. For service entrance equipment, connect the grounding electrode conductor to the ground bus.
 3. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground bus.
- E. Transformers:
 1. Exterior: Exterior transformers supplying interior service equipment shall have the neutral grounded at the transformer secondary. Provide a grounding electrode at the transformer.
 2. Separately derived systems (transformers downstream from service equipment): Ground the secondary neutral at the transformer. Provide a grounding electrode conductor from bar at the service equipment.
- F. Conduit Systems:
 1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor sized per CEC.
 2. Nonmetallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
 3. Metal conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.
- G. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders, power, and lighting branch circuits.
- H. Boxes, Cabinets, Enclosures, and Panelboards:
 1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes.
 2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
 3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.
- I. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.
- J. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.
- K. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

- L. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

3.4 CONDUCTIVE PIPING

- A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.5 TELECOMMUNICATIONS SYSTEM

- A. Bond telecommunications system grounding equipment to the electrical grounding electrode system. Refer to communications backbone cabling specification section.

3.6 GROUND RESISTANCE

- A. Grounding system resistance to ground shall not exceed 15 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Owner. Final tests shall assure that this requirement is met, and test results shall be submitted to the Owner with final close out documents.
- B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE Standard 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.
- C. Below-grade connections shall be visually inspected by the Inspector of Record (IOR) prior to backfilling. The Contractor shall notify the IOR 24 hours before the connections are ready for inspection.
- D. Furnish a copy of tests to Owner at completion of project.

END OF SECTION 26 05 26

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

CONDITIONS OF THE CONTRACT AND DIVISION 01, as applicable, apply to this Section.

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Conduit supports.
 - 2. Formed steel channel.
 - 3. Spring steel clips.
 - 4. Sleeves.
 - 5. Mechanical sleeve seals.
 - 6. Firestopping relating to electrical work.
 - 7. Firestopping accessories.
 - 8. Equipment bases and supports.

1.2 REFERENCES

- A. Underwriters Laboratories Inc.:
 - 1. UL 263 - Fire Tests of Building Construction and Materials.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
 - 3. UL 1479 - Fire Tests of Through-Penetration Firestops.
 - 4. UL - Fire Resistance Directory.

1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 PERFORMANCE REQUIREMENTS

- A. Firestopping: Conform to Building Code and UL for fire resistance ratings and surface burning characteristics.

1.5 SUBMITTALS

- A. Product Data:
 - 1. Hangers and Supports: Submit manufacturers catalog data including load capacity.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with the Building Code.

PART 2 PRODUCTS

2.1 CONDUIT SUPPORTS

- A. Manufacturers:
 - 1. Allied Tube & Conduit Corp.
 - 2. Electroline Manufacturing Company.

3. O-Z Gedney Co.
 4. Appleton.
- B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.
- C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.
- D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.
- E. Conduit clamps - general purpose: One hole malleable iron for surface mounted conduits.
- F. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self-locking. With Stainless tooth.

2.2 FORMED STEEL CHANNEL

- A. Manufacturers:
1. Allied Tube & Conduit Corp.
 2. B-Line Systems.
 3. Midland Ross Corporation, Electrical Products Division.
 4. Unistrut Corp.
- B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.3 SLEEVES

- A. Sleeves for raceway Through Non-fire Rated Floors: 18 gage galvanized steel.
- B. Sleeves for raceway Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage galvanized steel.
- C. Sleeves for raceway Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL Listed.
- D. Fire-stopping Insulation: Glass fiber type, non-combustible.

2.4 SPRING STEEL CLIPS

- A. Product Description: Mounting clamp, and screw.

2.5 MECHANICAL SLEEVE SEALS

- A. Manufacturers:
1. Thunderline Link-Seal, Inc.
 2. NMP Corporation.
- B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.6 FIRESTOPPING

- A. Manufacturers:
 - 1. Dow Corning Corp.
 - 2. Fire Trak Corp.
 - 3. Hilti Corp.
 - 4. International Protective Coating Corp.
 - 5. 3M fire Protection Products.
 - 6. Specified Technology, Inc.

- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
 - 1. Silicone Firestopping Elastomeric Firestopping: Multiple component silicone elastomeric compound and compatible silicone sealant.
 - 2. Foam Firestopping Compounds: Multiple component foam compound.
 - 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
 - 4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
 - 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
 - 6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
 - 7. Firestop Pillows: Formed mineral fiber pillows.

2.7 FIRESTOPPING ACCESSORIES

- A. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

- B. General:
 - 1. Furnish UL Listed products.
 - 2. Select products with rating not less than rating of wall or floor being penetrated.

- C. Non-Rated Surfaces:
 - 1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
 - 2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive sleeves.

- B. Verify openings are ready to receive firestopping.

3.2 INSTALLATION - HANGERS AND SUPPORTS

- A. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors or preset inserts as required.
 - 2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset

- fasteners or welded fasteners as required.
 - 3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors as required.
 - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts or hollow wall fasteners as required.
 - 5. Solid Masonry Walls: Provide expansion anchors or preset inserts as required.
 - 6. Sheet Metal: Provide sheet metal screws.
 - 7. Wood Elements: Provide wood screws.
- B. Inserts:
- 1. Install inserts for placement in concrete forms.
 - 2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over four (4) inches.
 - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
 - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.
- C. Install conduit and raceway support and spacing in accordance with CEC.
- D. Do not fasten supports to suspended ceiling support system, pipes, ducts, mechanical equipment, or conduit.
- E. Install multiple conduit runs on common hangers.
- F. Supports:
- 1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
 - 2. Install surface mounted cabinets and panelboards with minimum of four anchors.
 - 3. In wet and damp locations install steel channel supports to stand cabinets and panelboards one (1) inch off wall.
 - 4. Support vertical conduit at every floor.

3.3 INSTALLATION - FIRESTOPPING

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit, and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.
- D. Compress fibered material to maximum 40 percent of its uncompressed size.
- E. Place intumescent coating in sufficient coats to achieve rating required.
- F. Remove dam material after firestopping material has cured.
- G. Fire Rated Surface:
 - 1. Seal opening at all rated floors and walls as follows:
 - a. Install sleeve through opening and extending beyond minimum of one (1) inch on both sides of building element.
 - b. Size sleeve allowing minimum of one (1) inch void between sleeve and building

- element.
 - c. Pack void with backing material.
 - d. Seal ends of sleeve with UL Listed fire resistive silicone compound to meet fire rating of structure penetrated.
 - 2. Where cable tray, bus, or conduit, penetrates fire rated surface, install firestopping product in accordance with manufacturer's instructions.
- H. Non-Rated Surfaces:
- 1. Seal opening through non-fire rated floors and walls as follows:
 - a. Install sleeve through opening and extending beyond minimum of one (1) inch on both sides of building element.
 - b. Size sleeve allowing minimum of one (1) inch void between sleeve and building element.
 - c. Install type of firestopping material recommended by manufacturer.
 - 2. Install escutcheons where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
 - 3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with manufacturer's instructions.

3.4 INSTALLATION - SLEEVES

- A. Exterior watertight entries: Provide mechanical sleeve seals.
- B. Interior conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.
- C. Set sleeves in position in forms. Provide reinforcing around sleeves.
- D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- E. Extend sleeves through floors and walls one (1) inch above finished floor level. Caulk sleeves.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Conduit and fittings.
 2. Outlet boxes.
 3. Weatherproof outlet boxes.
 4. Junction and pull boxes.
 5. Floor boxes.
 6. Cabinets, termination cabinets.
 7. Gutters.

1.3 SUBMITTALS

- A. Provide Product Data for the Following Equipment:
 1. Conduit and fittings.
 2. Outlet boxes.
 3. Weatherproof outlet boxes.
 4. Junction and pull boxes.
 5. Floor boxes.
 6. Cabinets, termination cabinets.
 7. Gutters.
 8. Putty pads.
 9. Raceways

- B. Submit detailed conduit routing plan, for review and approval, prior to installation as follows:
 1. Exposed and/ or concealed in building walls for conduits larger than 2-inch outside diameter.
 2. All underground conduits (3/4-inch and larger) in duct bank; concealed in floor slabs, equipment pads and concrete slabs.

1.4 SUBMITTALS

- A. Minimum acceptable conduit sizes are summarized in the following table:

	Minimum Size
Underground, site wiring	1-1/2"
Underground <ul style="list-style-type: none"> • Building Wiring 	1"
Aboveground <ul style="list-style-type: none"> • Equipment or panel feeders • Telecommunications 	3/4"
Aboveground <ul style="list-style-type: none"> • Lighting or branch circuit wiring • Fire alarm • Security 	3/4"

Other	3/4"
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1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Conform to requirements of the CEC, latest adopted version.
 - 2. Furnish products listed by UL or other independent and nationally recognized testing firm.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- B. Protect PVC and PVC-coated metallic conduit from sunlight.
- C. Protection of and cleanliness of pathways and raceways must be assured during the construction process in order to eliminate the possibility of debris entering the conduit, duct, pathway resulting in decreased wire capacity and potential damage to installed conductors and cables.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Polyvinyl Chloride (PVC) coated galvanized rigid steel conduit and intermediate metal conduit shall be in accordance with NEMA RN 1. Coating shall be applied under controlled factory conditions. Prior to coating, conduit shall meet requirements of ANSI C80.1 and UL 6 or ANSI C80.6 and UL 1242 as appropriate. PVC coated conduits shall have ultra-violet (UV) inhibitor in the coating material.
- B. Intermediate Metal Conduit (IMC). Raceway shall be hot dipped galvanized mild steel in accordance with ANSI C80.6 and UL 1242 and shall bear the UL label. Conduit shall have same characteristics of rigid steel except for thinner wall.
- C. Galvanized Rigid Steel Conduit (GRSC or RGS), couplings and elbows shall be hot dip galvanized, rigid mild steel in accordance with ANSI C80.1 and UL 6. The conduit interior and exterior surfaces shall have a continuous zinc coating with a transparent overcoat of enamel, lacquer, or zinc chromate. Conduit shall be formed with continuous welded seams with a uniform wall thickness, in minimum 10-foot lengths, with threaded ends.
- D. Electrical Metallic Tubing (EMT). Electrical metallic tubing, including elbows and bends, shall be zinc coated, mild steel in accordance with the requirements of ANSI C80.3 and UL 797. The interior and exterior surfaces of the tubing shall have a continuous zinc coating. Conduit shall be formed with a continuous welded seam, with a uniform wall thickness, in minimum 10-foot lengths.
- E. Non-Metallic Conduit shall be as follows:
 - 1. Schedule 40: Conduit shall be 90 degree Celsius, polyvinyl chloride in conformance with NEMA TC-2 and UL 651 requirements.
 - 2. Spacers used in duct bank installations shall be high impact plastic, interlocking bases, and intermediate type spacers. Place spacers between 6 and 10 feet apart.
- F. Flexible Metal Conduit shall be galvanized steel meeting the requirements of UL 1. Flexible

aluminum conduit is not permitted.

- G. Liquid-Tight Flexible Metal Conduit shall be plastic jacketed, galvanized steel, "Sealtite" Type EF for general service areas or Type HC for high temperature when used under raised floor or in air plenums. Conduit shall be UL listed.
- H. Manufacturers:
 - 1. Outlet Boxes: Bowers, Raco, Orbit, Steel City or equal.
 - 2. Weatherproof Outlet Boxes: Bell, Red Dot, Carlon or equal.
 - 3. Floor Boxes: Wiremold/ Walker, Hubbell, Steel City, or equal.
 - 4. Junction and Pull Boxes: Circle AW, Hoffman, Wireguard or equal.
 - 5. Box Extension Adapter: Bell, Red Dot, Carlon or equal.
 - 6. Conduit Fittings: O-Z Gedney, Thomas & Betts, Raco, Crouse Hinds, or equal.
 - 7. Putty pads: 3M, Hilti, or equal.
 - 8. Heavy wall rigid non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
 - 9. Extra heavy wall non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
 - 10. Flexible Metal Conduit (FMC), Alfex, American Flexible Conduit or equal.
 - 11. Liquid tight flexible metal conduit, Anacanda (type UA), Electri-flex Liguatite or equal.
 - 12. Floor Boxes, Single Gang, Walker/ Wiremold 880 CS Series or approved equal.
 - 13. Floor Boxes, Multiple Gang, Walker/ Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/ or water resistant device covers.
 - 14. Masonry Boxes, outlets in concrete, Raco Series 690 or equal.
- I. Listed products for termination, coupling, extending, benching supports of raceways shall be used.

2.2 OUTLET BOXES

- A. NEMA 1 gutter, junction and pull boxes shall be fabricated from code gage steel finished in grey enamel with screw cover fronts and concentric knockouts in all sides.
- B. NEMA 3R gutter, junction and pull boxes shall be fabricated from code gage galvanized steel with screw cover fronts and concentric knockouts in the bottom only. Any penetrations to the side, top or back shall be weatherproofed in an approved manner such as "MYERS" gasketed type hub or equal.
- C. Steel outlet boxes and plaster rings shall be galvanized rigid assemblies, either one piece pressed or factory welded construction containing the size and number of knockouts required. Steel outlet boxes shall be manufactured, sized and installed in accordance with CEC Article 314. Device Outlet: Installation of one or two devices at common location, minimum 4" square, minimum 1-1/2" deep. Single or 2 gang flush device plaster ring. Raco or equal.
- D. Luminaire Outlet: minimum 4" square with correct plaster ring depth, minimum 1-1/2" deep with 3/8" luminaire stud if required. Provide proper depth plaster ring on bracket outlets and on ceiling outlets.
- E. Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Boxes shall be properly secured to the structure such that they are flush with the finish surface. Boxes shall be made structurally secure by means of the proper fastening devices.
- F. Accessories: Provide outlet box accessories as required for each installation, including

mounting brackets, wallboard hangers, extension rings, plaster rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

2.3 JUNCTION AND PULL BOXES

- A. Construction: Provide galvanized sheet steel junction and pull boxes, with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.
- B. Location:
 - 1. Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
 - 2. Install junction boxes and pull boxes as required to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets and appliances to 300 degrees.
 - 3. Locations: Junction boxes shall be located only where necessary and only in equipment rooms, closets, and accessible attic and underfloor spaces. A horizontal distance of 24" shall separate outlet boxes on opposite sides of occupancy separation walls, fire-rated walls or partitions.
 - 4. Labeling: Junction box covers shall be marked with indelible ink indicated the circuit numbers passing through the box.

2.4 CONDUIT FITTINGS

- A. Requirements: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.
- B. Steel boxes may allow for field knock-out modifications, but shall in all other ways conform to code requirements.

2.5 FLOOR BOXES - SINGLE GANG

- A. Construction: Deep cast iron fully adjustable before and after concrete pour with all required components for complete activation. Verify required components for application of service fittings, covers, monuments, and the like, attached to floor boxes.
- B. Activations:
 - 1. Flush: Provide brass duplex or single signal cover, hinged with set screw lock. Carpet or tile finish ring.
 - 2. Monuments: Provide stainless steel monuments with power receptacle or data grommet as noted.
 - 3. Coordinate specific application of systems as noted on Drawings.

2.6 FLOOR BOXES - MULTIPLE GANG

- A. Construction: Deep cast iron, fully adjustable before and after pour. Equal to Walker/ Wiremold RFB Series or Walker Omnibox multi-service floor box with carpet plates, and/ or water resistant device covers. Verify color. Partition for different power or signal applications. Provide required power receptacle devices and signal grommets or receptacles as noted. Flange type shall be compatible with floor covering for either carpet or vinyl as required and shall be brass type not polycarbonate.
- B. Floor mounted boxes shall be water tight and cast iron when installed in grade level

concrete slab floor, fully adjustable with interior and exterior leveling screws. Receptacle flange shall be brass with a duplex lift lid. Flange type shall be compatible with floor type. Before installation, coordinate exact location with Architect.

2.7 PUTTY PADS

- A. Intumescent moldable firestop putty designed to protect electrical outlet boxes.
- B. Provide putty pads of proper type around outlet boxes and/ or as detailed on plan to meet sound transmission restrictions and fire ratings of walls

2.8 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", "COMMUNICATIONS", or "SIGNAL" as appropriate.
- D. Rated covers: Use cast iron lid with H20 traffic rating when subject to vehicular traffic.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Conduit systems listed below are for use in installations where they are permitted to be used by CEC and/ or other occupancy restrictions. The below installation methods do not intend to suggest that these materials be installed in conflict with any applicable code. Special attention to applications shall be made in building types such as wet location, hazardous locations, assembly occupancy and multi-story, but not limited to these. Requirements which are more restrictive than the CEC may be called for by the drawings and/ or these specifications. These requirements must be adhered to. The Electrical Contractor shall be responsible to use the proper conduit system for the application. Exposed conduit is not allowed below ceilings or above slab of floor, without prior approval from Electrical Engineer. All conduits shall be concealed except in electrical and telecommunication rooms or where shown to be surface mounted. Exposed conduit (where allowed) shall be run square and plumb with building lines in an approved manner. Support roof mount conduits, where allowed, with minimum 12" wide approved rooftop supports (B-Line Durablok or approved equal) unless otherwise detailed in roof requirements or as specified in roofing specification. Strap conduits to blocks with proper sized conduit straps. Spacing of support shall be a minimum as provided for in the CEC. All exposed conduit mounted below 8' above finished grade shall be strapped at a minimum of 5' spacing.
- B. Non-Metallic Rigid Conduit shall be used, below concrete slabs on grade, or underground outside of a building slab or foundation. Maintain minimum depth requirements and cover with appropriate fill material. Conduit shall be heavy wall Schedule 40 or 80, rigid PVC only. Rigid utility P&C duct shall not be used in any application. Properly sized grounding conductors shall be installed per CEC article 250, in all non-metallic conduit branch circuit and feeder runs. PVC conduit shall be formed or field bent only with the use of properly approved bending tools such as to not decrease the internal bore of the conduit. All conduits shall be cut square and reamed of burrs. Approved and compatible glue shall be used on all PVC fittings to attain watertight joints.

- C. Galvanized Rigid Steel (GRS) conduit shall be used where exposed less than 8'-0" above finished grade to 18" below finished grade and where subject to physical damage. Conduits shall be cut square and reamed to remove burrs and sharp edges. Strap conduit below 8' above grade at 5' intervals. Unless otherwise noted, threadless setscrew and threadless weathertight fittings may be used in lieu of threaded fittings. All threaded ends entering a junction box of any type shall require one locknut on the inside and one on the outside of the enclosure and be provided with a plastic bushing or grounding bushing where necessary for proper grounding. Where exposed to moisture, a watertight hub or other approved method shall be required. All conduits shall be stubbed up straight and uniform into junction boxes, panels, cabinets, etc., and shall be (GRS) properly supported and strapped. All GRS conduit located below grade, shall be tape wrapped.
- D. Electrical Metallic Tubing (EMT) shall be used as allowed by code and as permitted by this specification. It shall not be in contact with soil or the concrete slab on the ground floor of any structure. Connectors and couplings shall be steel insulated set screw type where installed in indoor dry locations not subject to moisture. Where the potential for moisture is present, compression type weathertight fittings are required. One hole conduit straps are permitted from 1/2" to 1" and two hole conduit straps are required for size 1-1/4" and larger. EMT shall not be allowed in areas subject to severe physical damage. Install copper ground wire sized per CEC 250-122 in all EMT conduits.
- E. Flexible conduit may be used where concealed in building construction or above dropped ceilings, but shall meet the following criteria: No individual circuit path from distribution panel to last device shall exceed a cumulative length of 6' of flexible conduit from start to end. Flexible conduit shall not exceed a total directional change of 270 bending degrees in any one run between conduit terminations. Squeeze type or Jake type steel flex fittings of a grounding type are required. Flexible conduit must be supported in accordance with CEC. Where exposed to the weather, moisture, or spray down flexible conduit shall be of the liquidtight type. Fittings shall be manufactured for use with liquidtight flexible conduit. All motor connections shall be made with liquidtight flex. Flexible conduit may not be used where exposed except for last 2' of equipment connection and unless otherwise noted or approved. A copper ground wire sized per CEC 250-122 shall be installed in all flexible conduit runs. Flexible conduit may not be used exposed. Weatherproof liquid tight conduit shall not be used at roof level for equipment connections with lengths exceeding 24" nor shall it be used to circumvent a rigid conduit system in a horizontal direction. Connect recessed lighting fixtures to conduit runs with a maximum of 6' of flexible metal conduit extending from junction box to fixture.
- F. Underground conduits and transition to above grade/ slab shall be as follows:
1. PVC elbows 2" and smaller are allowed, or if top of elbow is minimum 18" BFG or below top of slab, otherwise GRS elbows are required.
 2. GRS risers are required from elbow below grade to equipment (device, outlet, panel, cabinet, etc.) above grade.
 3. GRS elbows/risers to be PVC coated or 10 MIL tape wrapped (1/2" lapped) to 3" above finish grade or top of slab.
- G. Conduit Supports: Conduit runs may be supported by one-hole and two-hole straps or supports as manufactured by Unistrut, Minerallac, Caddy or equals. Supports may be fastened by means of anchors, shields, beam clamps, toggle bolts, or other approved methods appropriate for the application and size of conduit. Pipe nailers (J-hooks) may only be used for 1" conduit and smaller and only in wood frame construction. Conduit support methods are subject to review by the engineer and authority having jurisdiction for adequacy. Installations deemed inadequate shall be corrected by the contractor at no cost to the Owner.
- H. Bends and offsets shall be made with approved tools for the type of conduit being utilized.

Bends shall be made without kinking or destroying the smooth bore of the conduit. Parallel conduits shall be run straight and true with bends uniform and symmetrical. Minimum radii shall be per CEC 344-24.

- I. Conduit Stub-outs below grade shall be capped with plastic cap, and identified by placing a pull box marked with correctly identified utility such as "Elec", "Tel", etc. Dimension for exact location on field record drawings. Provide lids for proper field application (i.e. traffic, incidental, pedestrian).
- J. Conduit Seals - Where below grade conduits enter structure through slab or retaining wall of building or basement, seal the inside of each conduit as follows:
 - 1. Provide damming material around conductors 3" into conduit. Polywater or equal.
 - 2. Fill 3" of conduit with 3M #2123 sealing compound.
 - 3. Wrap conductors where they exit the conduit with 3M #2229 "Scotch Seal" mastic tape. Lap tape to approximate diameter of the raceway and wrap outside of conduit opening with (minimum) one turn.
 - 4. Use conduit sealing bushings type CSB (O-Z/ Gedney) or equal.
 - 5. Empty conduits shall be sealed with standard non-hardening duct seal compound and then capped to prevent entrance of moisture and gases and to meet fire resistance requirements.
 - 6. Provide cable drip loop minimum 12" high.
- K. Marker tape: Place marker tape at 12" below finish grade along and above buried conduits. Label tape "CAUTION: ELECTRICAL LINES BELOW" or similar wording.
- L. Electrical and communications systems raceways routed underground shall not occupy the same trench as plumbing utilities such as sewer, water, storm drain, gas or other wet or dry gaseous utility system. A minimum of 12" of undisturbed earth is required. Where utilities must cross in closer proximity to each other due to physical constraints, 6" minimum crossing distances are allowed.
- M. Conduits, routed below footings, slabs, grade beams, columns, and other structural elements shall be installed in strict compliance with structural details and criteria shown on structural plans. Clearances below structural elements and sleeves through structural elements must be carefully planned to avoid conflict and must be approved by the structural engineer if conflict arises.
- N. All conduit or raceways passing through fire rated walls, floors, or ceilings shall be installed with a listed penetration method which protects the opening to the same rating as the assembly and is non hardening.
- O. Location: Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.
- P. Anchoring: Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.
- Q. Special Application: Provide weatherproof outlets for locations exposed to weather or moisture.
- R. Knockout Closures: Provide knockout closures to cap unused knockout holes where blanks have been removed.
- S. Mount outlet boxes, unless otherwise required by ADA and CBC, or noted on drawings, the following distances above the finished floor:
 - 1. Receptacles, Telephone, TV & Data outlets. (measured to bottom of outlet box): +15".

2. Outlet above counter (measured to top of outlet box): +46".
 3. Control (light) Switches. (measured to top of outlet box): +48".
 4. Fire Alarm Manual Pull Stations, T-stats. (measured to top of outlet box): +48".
 5. Fire Alarm Visuals: the lower of +80" to bottom of lens, or 6" below ceiling.
 6. Other Outlets: As indicated in other sections of specifications or as detailed on drawings.
- T. Coordinate all electrical device locations with the architectural floor plan and interior and exterior elevations to prevent mounting devices within elements that they may conflict such as cabinetry, mirrors, planters, etc.
- U. Size outlet and junction boxes to minimum wire fill space requirements. Upsize box as required to allow ease of wire installation and device installation.
- V. Outlet and junction boxes in fire rated walls shall be gauged and spaced so as not to exceed the maximum penetration allowed by the assembly without compromising the fire rating. If a conflict arises relative to a specific condition, the contractor shall follow the requirements of the fire authority and ask for guidance from the design team. At no time should a larger box be installed prior to resolution of conflict.

END OF SECTION 26 05 33

SECTION 26 05 53 - IDENTIFICATION OF ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section Includes:
 - 1. Nameplates and warning signs where specified herein and as shown on contract documents including the following:
 - a. Nameplates and warning signs permanently installed on all electrical equipment and devices including, but not limited to, the following items:
 - 1) Enclosures for transformers, switchboards, motor control, panels, pullboxes, cabinets, motors, generators, transfer switches.
 - 2) Enclosures for all separately enclosed devices including, but not limited to, disconnect switches, circuit breakers, contactors, time switches, control stations and relays, fire alarm panels and lighting control panel.
 - 3) Wall switches not within sight of outlet controlled.
 - 4) Special systems such as, but not limited to, telephone, fire alarm, warning, and signal systems. Identification shall be at each equipment rack, terminal cabinet, control panel, annunciator and pullbox.
 - 5) Devices mounted within and part of equipment including circuit breakers, switches, control devices, control transformers, relays, indication devices and instruments.
 - 2. Conductor and Cable Identification.
- B. Related Sections:
 - 1. Section 26 05 00: Common Work Results for Electrical.
 - 2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
- C. Reference Standards:
 - 1. California Electrical Code (CEC). California Code of Regulations, Title 24, Part 3.
 - 2. National Fire Protection Agency (NFPA):
 - a. 70E Standard for Electrical Safety in the Workplace.
 - 3. American National Standards Institute (ANSI):
 - a. A13.1 Pipe Markers.
 - b. Z535 Standards for Safety Signs and Labels.
 - 4. Underwriters Laboratories, Inc. (UL):
 - a. 969 Standard for Marking and Labeling Systems.
 - 5. Code of Federal Regulations, Title 29, Part 1910:
 - a. 144 Safety color code for marking physical hazards.
 - b. 145 Specifications for accident prevention signs and tags.

PART 2 PRODUCTS

2.1 EQUIPMENT LABEL DESIGNATIONS

- A. Equipment labels indicating equipment designations both emergency and normal. Designation per drawings or to be supplied with shop drawings approval.

- B. Panelboard labels showing panel designation, voltage, phase, and source.
- C. Distribution panels, transformers, safety switches, transfer equipment, etc. Labels shall be per ANSI Z535.4 guidelines.

2.2 MATERIALS

- A. For Labels: Three layer laminated plastic or micarta with engraved white letters over black background.
- B. For Emergency Equipment: Use engraved white letters over red background.
- C. For Warning Signs: Minimum 18 gauge steel with red lettering on white porcelain enamel finish.
- D. Arc flash labels shall be provided as required by CEC Article 70E.
- E. Conductor tape number markers: TayMac MX4280 Series non-fading permanent adhesive.

PART 3 EXECUTION

3.1 MOUNTING

- A. Equipment labels shall be mounted by self-tapping, threaded screws, and bolts, or by rivets. Adhesive types are not acceptable unless specifically noted in this section.
- B. Conductor tape markers shall be consistently placed for ready conductor identification.

3.2 HEIGHTS ON LABELS

- A. Panelboards, Switchboards and Motor Control Centers and Special Systems Enclosures: 1/4" identify equipment designation; 1/8" identify voltage rating and source.
- B. Individual Circuit Breakers, Switches, and Motor Starters in Panelboards, Switchboards, and Motor Control Centers: 3/16" identify circuit and load served, including location of equipment.
- C. Enclosed Circuit Breakers, Enclosed Switches, and Motor Starters: 3/16" identify load served.
- D. Transformers: 3/16" identify equipment designation; 1/8" identify primary and secondary voltages, primary source, and secondary load. Include location of primary source or secondary load if remote from transformer.

3.3 WARNING SIGNS

- A. Warning signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.
- B. Warning signs to read "DANGER - HIGH VOLTAGE", with letters 1-1/2" high, 3/16" stroke minimum.
- C. Provide warning sign on all doors or immediately next to door for equipment rooms, enclosures or closets containing equipment energized above 150 volts to ground as per

CEC, and/ or as directed by the Architect. For interior finish spaces and interior doors, signage shall be coordinated and approved with the Architect in advance of installation.

END OF SECTION 26 05 53

SECTION 26 09 43.13 – DIGITAL-NETWORK LIGHTING CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. System Software Interfaces.
 - 2. System Backbone and Integration Equipment.
 - 3. Wired Networked Devices.
- B. Related Requirements:
 - 1. Section 26 27 26 "Wiring Devices" for wired switches and dimmers and other Project requirements applicable to Work specified in this Section.

1.2 DEFINITIONS

- A. Data Bus: A wired interface used to communicate with connected devices.
- B. Device: A collective term for connected devices, including fluorescent ballasts, LED drivers, incandescent luminaires, manual switches, switching relays, sensors, and similar.
- C. Global: Communication between devices in otherwise separate spaces using a bridging device or system controller.
- D. Group: A set of devices that communicate together.
- E. Monitoring: Acquisition, processing, communication, and display of equipment status data, metered electrical parameter values, power quality evaluation data, event and alarm signals, tabulated reports, and event logs.
- F. Scene: Digital light level associated with a preset.
- G. System Backbone: Devices used to connect and manage otherwise separate spaces, including bridging devices and gateways or system controllers. Used to expose devices to software configuration via TCP/IP.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.
- B. Preinstallation Coordination Meeting(s): For digital-network lighting controls. Conduct meeting(s) **as videoconference**.
 - 1. Attendees: Installers, fabricators, representatives of manufacturers, and administrators for field tests and inspections. Notify Architect of scheduled meeting dates.
 - 2. Engage factory-authorized service representative to attend preinstallation conference and review the submittal drawing, sequence of operation, and device installation best practices with Project team.
 - 3. Engage factory-authorized service representative to perform cellular signal strength measurements during site walk through and compare to Project plans to verify the placement of cellular antennas and quantity of lighting control system RF access points.

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. Bill of Materials necessary to install the networked lighting control system.
 - 2. Product Specification Sheets indicating general device descriptions, dimensions, electrical specifications, wiring details, and nomenclature.
 - 3. Information Technology (IT) connection information pertaining to interconnection with facility IT networking equipment and third-party systems.
 - 4. Other Diagrams and Operational Descriptions - as needed to indicate system operation or interaction with other system(s).
- B. Shop Drawings:
 - 1. Riser Diagrams showing device wiring connections of system backbone and typical per room/area type.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor Startup/Commissioning Worksheet.
- B. Service Specification Sheets indicating general service descriptions, including startup, training, post-startup support, and service contract terms.
- C. Field quality-control reports.
- D. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Contracts:
 - 1. Hardware and Software Operation Manuals
 - 2. Maintenance service agreement.
 - 3. Software service agreement.
- B. Warranty documentation.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Phone Support: Toll-free technical support available from manufacturer through an online tool to schedule a technical support appointment and provide 24/7 emergency support.
 - 2. Remote Support: Manufacturer capable of providing remote support and ability to virtually connect with customers to address issues with visual guidance overlaid on images of real-world objects.
 - 3. Cellular Connectivity: Manufacturer capable of cellular connectivity to a networked lighting control systems available to provide remote support within the continental United States.
 - 4. On-Site Support: Manufacturer capable of providing a 72-hour, on-site response time within the continental United States.
 - 5. Service Contracts: Manufacturer capable of providing service contracts for continued on-site and remote support of the lighting control system post-installation for terms up to 10 years from substantial completion, including:
 - a. Remote and on-site emergency response.
 - b. Remote system performance checks.
 - c. Remote diagnostics.
 - d. Replacement parts.

1.8 WARRANTY

- A. Warranty: Manufacturer and Installer warrant that installed lighting control devices perform in accordance with specified requirements and agree to repair or replace, including labor, materials, and equipment, devices that fail to perform as specified within extended warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of lighting control hardware.
 - b. Faulty operation of lighting control firmware.
 - 2. Minimum Warranty Period: Five years from date of shipment.

PART 2 PRODUCTS

2.1 SYSTEM COMPLIANCE

- A. System components manufactured in accordance with UL 916 and UL 924 standards where applicable.
- B. System components manufactured in accordance with CFR Title 47, Part 15 standards where applicable.
- C. System components manufactured in accordance with ISED Canada RSS-247 standards where applicable.
- D. System components manufactured in accordance with IFT-008-2015 and NOM-208-SCFI-2016 standards where applicable.
- E. System listed as qualified under Design Lights Consortium Networked Lighting Control System Specification v5.0.
- F. Performance Criteria:
 - 1. Regulatory Requirements:
 - a. Listed and labeled in accordance with CEC, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.

2.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. System Architecture:
 - 1. System architecture based upon the following concepts:
 - a. Networkable intelligent lighting control devices.
 - b. Standalone lighting control zones using distributed intelligence.
 - c. Optional system backbone for remote, time-based, and global operation.
 - 2. Intelligent lighting control devices with individually addressable network communication capability and having one or more basic lighting control components including: occupancy sensor, photosensor, relay, dimming output, contact closure input, analog 0-10 V(dc) input, and manual wall station capable of indicating switching, dimming, and/or scene control. Combining one or more of these components into a single device enclosure permissible to minimize overall system device count.
 - 3. System capable of interfacing directly with networked luminaires such that either low-voltage network cabling is used to interconnect networked luminaires with control components such as sensors, switches, and system backbone.
 - 4. Networked luminaires and intelligent lighting control devices support individual (unique) configuration of device settings and properties, with such configuration residing within the networked luminaires and intelligent control devices.

5. Lighting control zones consisting of one or more networked luminaires and intelligent lighting control devices capable of providing automatic control from sensors (occupancy and/or photosensor) and manual control from local wall stations without requiring connection to a higher-level system backbone.
 - a. Lighting control zones (wired) support at least 128 devices per zone.
 - b. Capable of being networked with a higher-level system backbone to provide time-based control, control from inputs or systems external to control zone, and remote configuration and monitoring through a software interface.
 6. Networked luminaires and intelligent lighting control devices with distributed intelligence programming stored in non-volatile memory, such that following any loss of power the lighting control zones operate according to their defined default settings and sequence of operations.
 7. System to include one or more system controllers that provide time-based control.
 8. System controller provides means of connecting the lighting control system to a system software interface and building management systems via BACnet/IP or BACnet MS/TP protocol.
 9. System controller supports low voltage wired within a single controller device.
 10. System devices support firmware update, either remotely or from within the application space, for purposes of upgrading functionality at a later date.
 11. System capable of reporting lighting system events and performance data to management software for display and analysis.
- B. Wired Networked Control Zone Characteristics:
1. Connections to devices within a wired networked lighting control zone and to backbone components accomplished with a single type of low-voltage network cable, compliant with CAT5e specifications or higher. Use of mixed types of low-voltage network cables is unacceptable.
 2. Devices connected in "daisy-chain" topology. "Hub-and-spoke" topology, requiring all individual networked devices to be connected to a central component, is unacceptable, to reduce the total amount of network cable required for each control zone.
 3. Pre-terminated, plenum-rated, low-voltage network cabling supplied with hardware.
 4. Following proper installation and provision of power, all networked devices connected with low-voltage network cable must automatically form a functional lighting control zone without requiring any type of programming, regardless of the programming mechanism (e.g. software application, handheld remote, pushbutton).
 - a. The "out of box" default sequence of operation is intended to provide typical sequence of operation to minimize the system startup and programming requirements and to also have functional lighting control operation prior to system startup and programming.
 5. System software capable of automatic discovery of all connected devices without requiring any provisioning of system or zone addresses.
 6. Networked devices capable of detecting improper communication wiring and LED notification to alert installation/startup personnel.
 7. Networked control devices suitable for control of egress or emergency light sources without additional, externally mounted UL 924 shunting or 0-10 V(dc) disconnect devices, to provide a compliant sequence of operation while reducing the overall installation and wiring costs of the system. Capable of supporting the following sequence of operation:
 - a. Low-Voltage Power Sensing: Devices automatically provide 100 percent light level upon detection of loss of power sensed via low-voltage network cable connection where applicable.
 - b. Line-Voltage Power Sensing: Devices listed as UL 924 emergency relays which automatically close load-control relay and provide 100 percent light output upon detection of loss of power sensed via line voltage connection to normal power.
 8. Global Control Zones: Networked luminaires and intelligent lighting control devices located in different areas able to transmit and track information within at least 128

system-wide control zones to support required sequences of operation that may span multiple areas. Occupancy, photosensor inhibit, and switch commands available across multiple controllers.

9. Wired Networked Wall Station Scene-Control Capabilities:
 - a. Preset Scenes that activate a specific combination of light levels across multiple local and global channels.
 - b. Local Profile Support: Profile Scenes that modify the sequence of operation for devices in the area (group) in response to a button press to dynamically optimize occupant experience and lighting energy usage.
 - 1) Wall stations able to manually start and stop local profiles, or local profile capable of ending after a specific duration of time between five minutes and 12 hours.
 - 2) Configurable Parameters:
 - a) Fixture light level.
 - b) Occupancy time delay.
 - c) Response to occupancy sensors (including enabling/disabling response).
 - d) Response to daylight sensors (including enabling/disabling response).
 - e) Enabling/disabling wall stations.
 - c. Three-Way or Multi-Way Control: Multiple wall stations capable of controlling the same local and global control zones, to support "multi-way" preset scene and profile scene control.
- C. System Integration Capabilities:
 1. Capable of interface with third-party building management systems (BMS) to support two-way communication using BACnet/IP protocol, BACnet MS/TP protocol, and RESTful API including the following system integration capabilities:
 - a. "Write" messages for control of individual devices, including control of relay and dimming output.
 - b. "Write" messages for control of groups of devices through a single command, including control of relay and dimming output of all devices.
 - c. "Read" messages for individual device status information.
 - 1) Available status will vary based on device type and capabilities, which may include relay state, dimming output, power measurement, occupancy sensor status, and photosensor light measurement.
 - d. "Read" messages for group status information for occupancy, relay state, and dimming output.
 - e. Activation of pre-defined system Global Profiles.
 2. Activation of Global Profiles from third-party systems via dry contact closure output signals or digital commands via RS-232 or RS-485.
 3. Activation of demand response levels from Demand Response Automation Servers (DRAS) via OpenADR 2.0a protocol.
- D. Supported Sequence of Operations:
 1. Control Zones:
 - a. Local Control Zones: Networked luminaires and intelligent lighting control devices installed in an area (also referred to as a group of devices) capable of transmitting and tracking occupancy sensor, photosensor, and manual switch information within at least 48 unique control zones to support different and reconfigurable sequences of operation within area. These will also be referred to as local control zones.
 - b. Adjacent Control Zones: Networked luminaires and intelligent lighting control devices capable of tracking occupancy broadcasts from adjacent zones. When this feature is enabled, luminaire output for a vacant zone will reduce to a configurable dimmed state if one or more adjacent zones are occupied. Luminaires will turn off when both primary and adjacent zones are vacant.
 - c. Global Control Zones: Networked luminaires and intelligent lighting control devices

located in different areas able to transmit and track information within at least 128 system-wide control zones to support required sequences of operation that may span across multiple areas. Occupancy, photosensor inhibit, and switch commands available across multiple controllers.

2. Wall Station Capabilities:
 - a. Wall stations support the following capabilities:
 - 1) On/Off of a local or global control zone.
 - 2) Continuous dimming control of light level of a local or global control zone.
 - b. Multi-Way Control: Multiple wall stations capable of controlling the same local or global control zones, to support "multi-way" switching and dimming control.
3. Occupancy Sensing Capabilities:
 - a. Occupancy sensors configurable to control a local or global zone.
 - b. Multiple occupancy sensors capable of controlling the same local or global zones. This capability combines occupancy sensing coverage from multiple sensors without consuming multiple control zones.
 - c. Occupancy sensing sequence of operation modes:
 - 1) On/Off Occupancy Sensing.
 - 2) Partial-On Occupancy Sensing.
 - 3) Partial-Off Occupancy Sensing.
 - 4) Vacancy Sensing (Manual-On / Automatic-Off).
 - d. On/Off, Partial-On, and Partial-Off Occupancy Sensing Modes Sequence of Operation:
 - 1) Occupancy automatically turn lights on to a designated level when occupancy is detected. Designated occupied light level support at least 100 dimming levels.
 - 2) Occupancy sensors automatically turn lights off or to a dimmed state (Partial-Off) when vacancy occurs or if sufficient daylight is detected. Designated unoccupied dim level support at least 100 dimming levels.
 - 3) System capable of combining Partial-Off and Full-Off operation by dimming lights to a designated level when vacant and turning the lights off completely after an additional time delay.
 - 4) Photosensor readings, if enabled in occupancy sensing control zone, automatically adjust light levels during occupied or unoccupied conditions as necessary.
 - 5) Wall station activation changes the dimming level or turn lights off as selected by the occupant. Lights optionally remain in this manually specified light level until the zone becomes vacant. Upon vacancy, normal sequence of operation resumes.
 - e. Vacancy Sensing or Manual-On/Automatic-Off Mode Sequence of Operation:
 - 1) Activation of a wall station is required turn lights on. System capable of programming the zone to turn on to either a designated light level or previous user-set light level. Initially occupying the space without using a wall station must not result in lights turning on.
 - 2) Occupancy sensors automatically turn lights off or to a dimmed state (Partial-Off) when vacancy occurs or if sufficient daylight is detected. Designated unoccupied dim level support at least 100 dimming levels.
 - 3) System capable of dimming the lights when vacant and then turning the lights off completely after an additional time delay.
 - 4) System capable of an "automatic grace period" immediately following detection of vacancy, during which time any detected occupancy results in the lights reverting to the previous level. After the grace period has expired, the use of a wall station is required to turn lights on.
 - 5) Photosensor readings, if enabled in the Occupancy Sensing control zone, capable of automatically adjusting the light level during occupied or unoccupied conditions as necessary.
 - 6) Wall station interaction changes the dimming level or turn lights off as

- selected by occupant. Lights remain at manually specified light level until zone becomes vacant; normal sequence of operation resumes upon vacancy.
- f. Occupancy time delays before dimming or shutting off lights separately programmable for all control zones from 15 seconds to 2 hours.
4. Photosensor Sensing Capabilities (Automatic Daylight Sensing):
 - a. Photosensor devices configurable to control a local zone.
 - b. Photosensor-Based Control:
 - 1) Continuous Dimming: Control zone automatically adjusts dimming output in response to photosensor readings, to maintain a minimum light level consisting of both electric light and daylight sources. Photosensor response configurable to adjust set point and dimming rates.
 5. Schedule Capabilities:
 - a. System capable of time schedules for time-of-day to override devices including offsets from dusk and dawn.
 - b. System capable of providing a visible "blink warning" five minutes prior to the end of the schedule.
 - c. Wall stations may be programmed to provide timed extensions/overrides that turn the lights on for an additional time period.
 - 1) Timed override/extension duration programmable for each individual device, zone of devices, or customized group of devices, from five minutes to 12 hours.
 6. Global Profile Capabilities:
 - a. System capable of automatically modifying the sequence of operation for selected devices in response to any of the following:
 - 1) Time-of-day schedule.
 - 2) Contact closure input state.
 - 3) Manually triggered wired wall station input.
 - 4) RS-232/RS-485 command to wired input device.
 - 5) BACnet input command.
 - b. Global Profile Capabilities:
 - 1) Global Profiles stored within and executed from the system controller (via internal timeclock). Dedicated software host or server is not required to be online to support automatic scheduling and/or operation of Global Profiles.
 - 2) Global Profile time-of-day schedules capable of recurrence settings including daily, specific days of week, every "n" number of days, weekly, monthly, and yearly. Lighting control global profile schedules support definition of start date, end date, end after "n" recurrences, or never ending.
 - 3) Daylight savings time adjustments capable of being performed automatically, if desired.
 - 4) Global Profile holiday schedules follow recurrent settings for specific U.S. holiday dates regardless if they always occur on a specific date or are determined by day/week of the month.
 - 5) Global Profiles capable of being scheduled to run according to timed offsets relative to sunrise or sunset. Sunrise/sunset times automatically derived from location information using an astronomical clock.
 - 6) Software management interface capable of displaying a graphic calendar view of profile schedules for each control zone.
 - 7) Global Profiles capable of manual activation directly from system controller, specially programmed wired input devices, scene-capable wired wall stations, and software management interface.
 - 8) Global Profiles selectable to apply to a single device, zone of devices, or customized group of devices.
 - 9) Global Profile Configurable Parameters:
 - a) Fixture light level.
 - b) Occupancy time delay.

- c) Response to occupancy sensors (including enabling/disabling response).
- d) Response to daylight sensors (including enabling/disabling response).
- e) Enabling/disabling of wall stations.
- c. Local and Global Profiles backed up and stored on software's host server such that Profile backup can be applied to a replacement system controller or wired wall station.
- 7. System supports automated demand response capabilities with automatic reduction of light level to at least three levels of demand response, configurable for each output device.

2.3 SYSTEMS SOFTWARE INTERFACES

- A. Management Interface:
 - 1. Web-based management interface for remote system control, live status monitoring, and configuration of lighting control settings and schedules.
 - 2. Compatible with industry-standard web browser clients.
 - 3. Minimum of 100 unique password-protected user accounts.
 - 4. Minimum of three user permission levels: read-only, read and change settings, and full administrative system access.
 - 5. Capable of restricting access for user accounts to specific devices within the system.
 - 6. All system devices capable of being given user-defined names.
 - 7. Device identification information displayed in the Management interface including:
 - a. Model number.
 - b. Model description.
 - c. Serial number or network ID.
 - d. Manufacturing date code.
 - e. Custom label.
 - f. Parent network device.
 - 8. Management interface capable of displaying live status of a networked luminaire or intelligent control device including:
 - a. Luminaire on/off status.
 - b. Dim level.
 - c. Power consumption.
 - d. Device temperature.
 - e. PIR occupancy sensor status.
 - f. Microphonic occupancy sensor status.
 - g. Remaining occupancy time delay.
 - h. Photosensor reading.
 - i. Active Profiles.
 - 9. Management interface capable of displaying and modifying the current active settings of a networked luminaire or intelligent control device including:
 - a. Dimming trim levels.
 - b. Occupancy sensor and photosensor enable/disable.
 - c. Occupancy sensor time delay and light level settings.
 - d. Occupancy sensor response (normal or vacancy).
 - e. Photosensor setpoints and transition time delays.
 - 10. Management interface capable of applying settings changes for a zone of devices or a group of selected devices using a single action that does not require the user to apply settings changes for each individual device.
 - 11. Management interface capable of compiling a printable network inventory report.
 - 12. Management interface capable of compiling a printable report detailing all system profiles.
 - 13. All sensitive information stored encrypted.
 - 14. System software updates available for automatic download and installation via the Internet.

- B. System Energy Analysis and Reporting:
1. Intuitive graphical screens to facilitate simple viewing of system energy performance.
 2. Energy Scorecard: Summarized display that indicates calculated energy savings in dollars or KWh.
 3. Software calculates allocation of energy savings by control measures including occupancy sensors, photosensors, and manual switching.
 4. Energy savings data calculated for the system as a whole.
 5. Time-scaled graph showing all relay transitions.
 6. Time-scaled graph showing zone occupancy time delays.
 7. Time-scaled graph showing the total light level.
 8. Software capable of storing information remotely onto an open-source, object-relational database, such as PostgreSQL.
 9. Data stored in the database will be accessed utilizing an open standard, application programming interface, such as Open Database Connectivity (ODBC).
- C. Visualization and Programming Interfaces:
1. System provides an optional web-based visualization interface that displays a graphical floorplan.
 2. Graphical floorplan will offer the following types of system visualization:
 - a. Full Device Option: Master graphic of entire building, by floor, showing each control device installed with zones outlined including:
 - 1) Controls embedded light fixtures.
 - 2) Controls devices not embedded in light fixtures.
 - 3) Daylight sensors.
 - 4) Occupancy sensors.
 - 5) Wall switches and dimmers.
 - 6) Scene controllers.
 - 7) Networked relays.
 - 8) Wired bridges.
 - 9) System Controllers.
 - 10) Wired relay panels.
 - 11) Group outlines.
 - b. Group-Only Option: Master graphic of the entire building, by floor, showing only control groups outlined.
 - c. Pan and zoom commands supported to allow smaller areas to be displayed on a larger scale simply by panning and zooming each floor's master graphic.
 - d. Selecting any control device displays the following as applicable:
 - 1) Device catalog number.
 - 2) Device name and custom label.
 - 3) Device diagnostic information.
 - 4) Link to further information on device including status or current configuration.
 3. Programming capabilities through the application will include the following:
 - a. Switch, occupancy sensor, and photosensor zone configuration.
 - b. Manual-on or automatic-on modes.
 - c. Turn-on and dim to dimming levels.
 - d. Occupancy sensor time delays and PIR sensitivity.
 - e. Dual technology occupancy sensors sensitivity.
 - f. Photosensor calibration adjustment and auto-setpoint.
 - g. Multiple photosensor zone offset.
 - h. Trim level settings.
 - i. Preset scene creation and copy for scene-capable devices.
 - j. Application of custom device labels to the Bluetooth Low-Energy Programming Devices and individual connected lighting control devices.
 - k. Fade rate settings.
- D. Smartphone Programming Interface for Wired Devices:

1. Interface provided for both Apple iOS and Android operating systems that allows configuration of lighting control settings.
2. Application supports configuration or wired networked control devices.
 - a. Connected device access granted through user-defined passcode at initial install.
 - b. Indication of signal strength where multiple Bluetooth Low-Energy Programming Devices are available for configuration.
3. Programming Capabilities:
 - a. Switch, occupancy sensor, and photosensor group configuration.
 - b. Manual-on or automatic-on modes.
 - c. Turn-on and dim to dimming levels.
 - d. Occupancy sensor time delays and PIR sensitivity.
 - e. Dual technology occupancy sensors sensitivity.
 - f. Photosensor calibration adjustment and auto-setpoint.
 - g. Multiple photosensor zone offset.
 - h. Trim level settings.
 - i. Preset scene creation.
 - j. Application of custom device labels for individual connected lighting control devices.
 - k. Fade rate settings.

2.4 SYSTEM BACKBONE AND SYSTEM INTEGRATION EQUIPMENT

- A. System Controller: Multi-tasking, real-time digital control processor consisting of modular hardware with plug-in enclosed processors, communication controllers, and power supplies.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nECY or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 2. System Controller Processor: 32-bit microprocessor operating at a minimum of 1 GHz.
 3. System Controller Memory: Minimum of 512MB memory, with a minimum of 4GB non-volatile flash, to support operating system and databases.
 4. System Controller Functions:
 - a. Time-based control of downstream wired network devices.
 - b. Linking into an Ethernet network.
 - c. Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.
 - d. Connection to various software interfaces, including management interface, historical database and analytics interface, and visualization interface.
 5. Integral web server to support system controller configuration and diagnostics.
 - a. Web Server Control Interface:
 - 1) Display associated devices within the context of a graphical floorplan.
 - 2) Provide control of output-capable devices through virtual sliders, toggle buttons, preset level widgets, and transparent layers on floorplan.
 - 3) Control Capabilities:
 - a) Control of individual output devices, including control of relay state and analog dimming level where applicable.
 - b) Control of local lighting control zones, including control of relay state and analog dimming level where applicable.
 - c) Control of global lighting control zones, including control of relay state and analog dimming level where applicable.
 - d) Control of Global Profiles.
 - b. Visualization Interface:
 - 1) Customizable display with the ability to superimpose colored, transparent layers representing real-time property values, including occupancy status, dimming level status, light level status, and online or offline status where applicable.

- 2) Ad hoc display of trended information via an intuitive values-over-time graph.
- 3) Report Creation:
 - a) Reports accept and graphically display trended status datasets for creator selected devices or zones of devices.
 - b) Report information displayed over a user-defined interval and date range.
 - c) Reports exportable to a standard CSV format.
6. Graphical touch screen to support configuration and diagnostics.
7. Minimum of three RJ-45 networked lighting control ports for connection to any of the following:
 - a. Graphical touch screen.
 - b. Wired communication bridges.
 - c. Direct connection to networked wired luminaires and intelligent lighting control devices (up to 128 total devices per port).
8. Device will automatically detect all network-connected devices.
9. Capable of managing and operating a minimum of 750 networked devices (wired) per system controller.
10. Multiple System Controllers capable of connection via LAN for scalability to a minimum of 20,000 networked devices.
11. Supports BACnet/IP and BACnet MS/TP protocols to directly interface with BMS and HVAC equipment without additional protocol translation gateways.
 - a. BACnet MS/TP Connection Speed: 9600 to 115200 baud rate.
 - b. BACnet Testing Laboratory (BTL listed) using Device Profile BACnet Building Controller (B-BC) with outlined enhanced features.
12. Integral FIPS 140-2, Level 1 cryptographic module.
13. Supports RESTful API for control of BACnet objects, user management, date and time, and file management.
14. NEMA 1 enclosure with Class 1 and Class 2 separation.
 - a. Power Supply Voltage: **120 to 277V(ac)**.
15. System Controller Security Provisions:
 - a. Disallow the use of default passwords and require passwords to be updated prior to use.
 - b. Support user role-based access, such as administrator, user, and viewer.
 - c. Signed firmware to ensure that unmodified, authentic software is always installed.
 - d. IP-based communication protected with strong encryption algorithms such as AES or TLS1.2+.
 - e. Prevent rollback of firmware to firmware versions with known, critical vulnerabilities.
 - f. Valid cybersecurity listing through a third party.
16. Cellular Remote Access: Cellular router and modem for remote access.
 - a. Router supports remote access to at least five system controllers on its local area network or network subnet.
 - b. Remote access capable of device setting updates, schedule updates, system performance optimization, and diagnostics.
 - c. Remote access enabled through outbound communication from router to an outside source. Solutions that begin communication via inbound requests for network access are unacceptable.
 - d. Router supports outbound communication to manufacturer-hosted portal using TLS1.2 or greater in-transit encryption over a cellular or Ethernet connection.
 - e. Router with integral firewall to prevent unauthorized access to devices connected to its local area network port.
 - f. Router includes cellular SIM capable of connection to AT&T, T-Mobile, Sprint, US Cellular, Alaska Wireless, Telefonica, Tellus, Bell, or Sasktel networks where carrier service is available.
 - g. Outbound communication from the router limited to whitelisted endpoints. Devices that allow unrestricted communication are unacceptable.

- h. Outbound communication from router includes only lighting control system information.

2.5 WIRED NETWORKED DEVICES

- A. Wired Networked Wall Switches, Dimmers, Scene Controllers:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 - 2. Mounting: Suitable for installation in single-gang switch box.
 - 3. Communication and low-voltage power delivered via standard low-voltage network cabling with RJ-45 connectors.
 - 4. All switches detect valid communication and blink a unique LED pattern to visually indicate a potential wiring issue.
 - 5. Devices with mechanical push buttons provide tactile and LED user feedback.
 - 6. Devices with mechanical push buttons manufactured with custom button labeling.
 - 7. Wall switch and dimmer options:
 - a. Control Types Supported:
 - 1) On/Off.
 - 2) On/Off/Dimming.
 - 3) On/Off/Dimming/Correlated Color Temperature Control for specific luminaire types.
 - b. Color: **White**.
 - 8. Scene Controller Options:
 - a. Control Types Supported:
 - 1) On/Off.
 - 2) On/Off/Dimming.
 - 3) Preset Level Scene Type.
 - 4) On/Off/Dimming/Preset Level for Correlated Color Temperature.
 - 5) Reprogramming of other devices within daisy-chained zone to implement user-selected lighting scene including manual start/stop from the scene controller, or optionally programmed automatic stop after a user-selectable duration between five minutes and 12 hours.
 - 6) Selecting a lighting profile to be run by device's upstream controller to implement a selected lighting profile across multiple zones including manual start/stop from the scene controller, or optionally programmed automatic stop after a user selectable duration between five minutes and 12 hours.
 - b. Color: **White**.
- B. Networked Graphic Wall Stations:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nPOD TOUCH or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 - 2. Mounting: Suitable for installation in single-gang switch box.
 - 3. Integral 3.5-inch (88 mm) capacitive full-color touch screen.
 - 4. Power via polarity insensitive Class 2 low-voltage 15 to 24V (dc) power supply.
 - 5. Device enables mobile application control of control zones and scenes through Bluetooth.
 - 6. Communication over standard low-voltage network cabling with RJ-45 connectors.
 - 7. User-customizable screen saver utilizing uploaded image file in common file format including jpg, png, gif, bmp, or tif.
 - 8. Capable of configuration of all switches, dimmers, control zones, and lighting preset scenes via password-protected setup screens.

9. Graphic Wall Station Options:
 - a. Number of Control Zones: Up to 16.
 - b. Number of Scenes: Up to 16.
 - c. Profile Scene Duration: User configurable from five minutes to 12 hours.
 - d. Color: **White**.

- C. Digital Time Clock:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nDTC or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 2. Controls a linear bus of lighting devices supplying all time functions without connection to a system controller.
 - a. Programming of the linear bus of lighting devices must not require additional hardware, including computers, specialized dongles, or other connection devices.
 - b. Programming of the linear bus exclusively done through the touch-screen interface.
 3. Capable of up to 32 schedules. Each schedule consists of one set of On and Off times per day for each day of the week and for each of two holiday lists. Schedules assignable to any individual relay or group of relays.
 4. Operates from non-volatile memory so that all system programming is retained indefinitely.
 5. Mounted inside a relay panel to eliminate the necessity for additional enclosures for complete installation.
 6. Capacitive 3.5-inch (88 mm), full-color touch screen.

- D. Wired Networked Digital Key Switches:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nPODA KEY or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 2. Mounting: Suitable for installation in single-gang switch box.
 3. Communication and low-voltage power delivered via standard low-voltage network cabling with RJ-45 connectors.
 4. All switches detect valid communication and blink a unique LED pattern to visually indicate a potential wiring issue.
 5. LED user feedback to provide indication of on/off status of the programmed lights or scene, as well as indication of device power.
 6. Digital Key Switch Options:
 - a. Control Types Supported:
 - 1) On/Off.
 - 2) On/Off/Dimming.
 - 3) Preset Level Scene Type.
 - 4) On/Off/Dimming/Preset Level for Correlated Color Temperature.
 - 5) User-programmed local lighting scene run within a daisy-chained group including manual start/stop from the switch, or optionally programmed automatic-stop after a user-selectable duration between five minutes and 12 hours.
 - 6) User-programmed global lighting profile run by an upstream controller across multiple groups including manual start/stop from the switch, or optionally programmed automatic-stop after a user-selectable duration between five minutes and 12 hours.
 - b. Color: **White**.

- E. Wired Networked Auxiliary Input/ Output (I/O) Devices:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight;

- Acuity Brands Lighting, Inc.; nIO series or comparable product by one of the following:
- a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
2. Plenum rated.
 3. Communication and low-voltage power delivered to each device via standard low-voltage network cabling with RJ-45 connectors.
 4. Auxiliary Input/ Output Devices Options:
 - a. Contact closure or pull-high input.
 - 1) Input programmable to support maintained or momentary inputs that can activate local or global scenes and profiles, activate lights at a preconfigured level, ramp light level up or down, or toggle lights on/off.
 - b. 0-10V analog input.
 - 1) Input supports zero to 10 V dimming output control from a dimmer switch.
 - 2) Input programmable to function as a daylight sensor.
 - c. RS-232/RS-485 digital input.
 - 1) Input supports activation of up to four local or global scenes and profiles, and on/off/dimming control of up to 16 local control zones.
 - 2) Provides relay and dimming level status to external device (e.g. Touchscreen) when polled.
 - d. 0-10V dimming control output, capable of sinking up to 20mA.
 - 1) Output programmable to support all standard sequence of operations supported by system.
 - e. Digital control output via eldoLED LEDcode communication.
 - 1) Output programmable to support light intensity control, as well as optional correlated color temperature (CCT) control, of the connected luminaire.
- F. Wired Networked DMX Interface Stations:
1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nPWDMX or comparable product by one of the following:
 - a. ETC.
 - b. Lutron.
 2. Description: Multi-protocol, bidirectional DMX512 playback (snapshot) and lighting control gateway.
 - a. Capable of control of networked luminaire or all normal power lighting load types.
 - b. Capable of control of DMX lighting through:
 - 1) DMX input for snapshot capture of lighting presets.
 - 2) Live control of intensity, hue, and saturation of configured DMX Zones from connected stations.
 - c. Integral LED indicators for power, network traffic, processor health, identify, DMX port configuration and status.
 - d. Support recall of up to 16 (total):
 - 1) Prerecorded scenes/snapshots for playback.
 - 2) DMX zones.
 - e. Capable of preset playback as activated by any connected control station.
 - f. Capable of DMX pass-through for real-time output of incoming DMX levels.
 - g. Support four universes of ANSI E1.31 sACN-Streaming ACN (sACN), including priorities, for snapshot capture and recall.
 - h. Support ANSI E1.20 RDM with PC-based software.
 - i. Act as an ANSI E1.33 RDMnet controller.
 3. General Requirements:
 - a. Operating Voltages:
 - 1) PoE Class 2 Device.
 - 2) 24 V(dc) (not used if using PoE), 7 W maximum power consumption.
 - b. Operating Temperature: Minus 32 to plus 113 deg F (0 to 45 deg C).
 - c. DIN-Rail Mounted on DIN 43880 (35/7.5) rail.
 - d. NEMA Type 1 enclosure.

- 1) Enclosure Size: 10 inches (260 mm) wide by 13 inches (330 mm) high by 4.5 inches (114 mm) deep.
4. Features:
 - a. Lighting control ports supports:
 - 1) Communication through lighting control (RJ-45) ports that supply 40 mA of power to each device via standard Category 5e low-voltage network cabling.
 - 2) Detection of valid communication and blinking of a unique LED pattern to visually indicate a potential wiring issue.
 - b. DMX Ports:
 - 1) Comply with the requirements of ANSI E1.11 USITT DMX512-A standards.
 - 2) Configurable as Input or Outputs.
 - 3) Support ANSI E1.31 sACN.
 - 4) Support Pathway Secure Streaming ACN (ssACN).
 - 5) Comply with California Title 1.81.26.
 - 6) Comply with ANSI E1.20 RDM.
 - 7) Capable of withstanding fault voltages of up to 250 V(ac) without damage.
 - c. Dry contact closure input to connect with external control systems to control a lighting control zone or scene.
 - d. Ethernet Ports:
 - 1) Support IEEE 802.3af Power-over-Ethernet in absence of 24 V(dc).
 - 2) Support auto-negotiated 10/100MB connections speeds.
 - 3) Support IEEE 802.1AB Link Layer Discovery Protocol.
 - e. Test Functions:
 - 1) Operate without need of a configuration PC to check local wiring.
 - 2) Test connectivity with DMX lights and networked luminaire or all normal power lighting load types.
 - f. Complies with the following:
 - 1) RoHS 2011/65/EU + A1 2015/863.
 - 2) FCC.
- G. Wired Networked Occupancy and Photosensors:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 2. Detect the presence of human activity within space and fully control the on/off function of lights.
 3. Utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state, thus preventing false on conditions. Ultrasonic and Microwave-based sensing technologies are unacceptable.
 4. Dual technology sensors used in locations where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions).
 5. Dual technology sensors must have one sensing technology not motion dependent to detect occupancy. Acceptable dual technology includes PIR/Microphonics (also known as Passive Dual Technology or PDT), which detects both occupant motion and sounds indicating occupants. Sensors where both technologies detect motion (PIR/Ultrasonic) are unacceptable.
 6. All sensing technologies are acoustically passive, meaning they do not transmit sound waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers and hearing devices). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonic technology. Ultrasonic and Microwave-based sensing technologies are unacceptable.
 7. Ceiling, fixture, recessed, and corner mounted sensors available, with multiple lens options available customized for specific applications.

8. Communication and low-voltage power delivered to each device via standard low-voltage network cabling with RJ-45 connectors.
 9. All sensors detect valid communication and blink a unique LED pattern to visually indicate a potential wiring issue.
 10. Sensor programming parameter available and configurable remotely from the software and locally via the device push button.
 11. Ceiling mount occupancy sensors include one integrated dry contact switching relay, capable of switching 1 A at 24 V, resistive only.
 12. Sensors available with one or two occupancy "poles," each of which provides a programmable time delay.
 13. Photosensor/daylight override, automatic dimming control, and low temperature/high humidity operation.
 14. Photosensor provide one on/off set-point and include a dead band to prevent the artificial light from cycling. Delay incorporated into the photosensor to prevent rapid response to passing clouds.
 15. Photosensor and dimming sensor's set-point and dead band automatically calibrated through the sensor's microprocessor by initiating an "Automatic Set-Point Programming" procedure. Min and max dim settings as well as set-point may be manually entered or modified.
 16. Dead band setting verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
 17. Dual zone option available for On/Off Photosensor, Automatic Dimming Control Photosensor, or Combination units. The secondary daylight zone capable of being controlled as an "offset" from the primary zone.
- H. Wired Networked Wall Switch Sensors:
1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 2. Mounting: Suitable for installation in single-gang switch box.
 3. Communication and low-voltage power delivered via standard low-voltage network cabling with RJ-45 connectors.
 4. All switches detect valid communication and blink a unique LED pattern to visually indicate a potential wiring issue.
 5. Devices with mechanical push buttons provide tactile and LED user feedback.
 6. Wall Switch Sensor Options:
 - a. User Input Control Types: **On/Off/Dimming**.
 - b. Occupancy Sensing Technology: **PIR only**.
 - c. Daylight Sensing Option: Inhibit Photosensor.
 - d. Color: **White**.
- I. Wired Networked Embedded Fixture Sensors:
1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nES or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 2. Network system sensors with occupancy sensors and/or dimming photosensors that can be embedded into luminaire such that only the lens shows on luminaire face.
 3. Occupancy sensor detection pattern suitable for 7.5 to 20-ft. (2.2 to 6-m) mounting heights.
- J. Wired Networked Power Packs:
1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nPP16 series or comparable product by one of the

following:

- a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 2. Plenum rated.
 3. Communication will be delivered to each device via standard low-voltage network cabling with RJ-45 connectors.
 4. Supply Voltage: **120 to 277V(ac)**.
 5. Relay Output: Class 1 relay rated for 16 A at **277 V(ac)** and 1/2 HP at 120 V(ac).
 6. Dimming Output: 0-10 VDC Dimming output.
 7. Sink Current: 100 mA at 0-10 V(dc).
 8. Mounting: Integral 1/2-inch (16-mm) chase nipple. Plastic clips into junction box are unacceptable.
- K. Wired Networked Relay and Dimming Panel:
1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; ARP or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 2. Field Configurable Relays (FCR):
 - a. Field configurable to operate in single-, double-, or triple-pole relay groupings.
 - b. Field configurable to operate as normally closed or normally open.
 - c. Provides visual status of current state and manual override control of each relay.
 - d. Minimum Relay Contact Ratings:
 - 1) 40 A at 120-480 V(ac) Ballast.
 - 2) 16 A at 120-277 V(ac) Electronic.
 - 3) 20 A at 120-277 V(ac) Tungsten.
 - 4) 20 A at 48V (dc) Resistive.
 - 5) 2 HP at 120 V(ac).
 - 6) 3 HP at 240-277 V(ac).
 - 7) 65kA SCCR at 480 V(ac).
 3. Dimming Output Rating: Minimum of 100 mA sink current per dimming output.
 4. Relay and dimming outputs individually programmable.
 5. Listing: UL 924 for control of emergency lighting circuits.
 6. Power Supply: Integrated **120-277V(ac)** supply.
 7. Low-Voltage Sensor Input:
 - a. Configurable to support any of the following input types:
 - 1) Indoor Photosensor.
 - 2) Outdoor Photosensor.
 - 3) Occupancy Sensor.
 - 4) Contact Closure.
 - b. Low-voltage sensor input provides 24 V(dc) power for sensor so additional auxiliary power supplies are not required.
 - c. Sensor input supports all standard sequence of operations.
 8. Integrated Digital Time Clock for local schedule control.
 9. Contact Closure Input: One for each group of eight output relays that acts as a panel override to activate the normally configured state of all associated relays (i.e., normally open or normally closed).
 10. Panel supplies current limited low-voltage power to other networked devices connected via low-voltage network cable.
 11. Enclosure:
 - a. Enclosure Rating: NEMA 1.
 - b. In "Mounting" Subparagraph below, flush-mounted option is only available for panels with up to 16 relay outputs.
 - c. Mounting: **Surface** mounted.
 - d. In "Cover" Subparagraph below, screw-fastened cover option is only available for panels with up to 16 relay outputs.

- e. Cover: **Hinged cover with keyed lock.**

- L. Wired Networked Bluetooth Low-Energy Programming Device:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nIO BT or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 - 2. Plenum rated, inline wired, and screw mountable.
 - 3. Communication and low-voltage power delivered to device via standard low-voltage network cabling with RJ-45 connectors.
 - 4. Bluetooth communication allows connection from smartphone application for programming device settings within the local daisy-chain zone.
 - 5. Device provides visual indication of remote Bluetooth connection via LED integrated into device enclosure such that it is visible from all angles while the zone is being programmed.

- M. Wired Networked Communication Bridge:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide nLight; Acuity Brands Lighting, Inc.; nBRG or comparable product by one of the following:
 - a. Cooper Industries, Inc.
 - b. Leviton Manufacturing Co., Inc.
 - 2. Suitable for surface mount to a standard 4 by 4-inch (100 by 100 mm) square junction box.
 - 3. Communication Ports: Eight RJ-45 ports for connection to lighting control zones (up to 128 devices per port), additional network bridges, and System Controller.
 - 4. Capable of aggregating communication from multiple lighting control zones for purposes of minimizing backbone wiring requirements back to System Controller.
 - 5. Power Input: Class 2 low-voltage supplied locally via a directly wired power supply.
 - 6. Wired Bridge capable of redistributing power from its local supply and connected lighting control zones with excess power to lighting control zones with insufficient local power. Architecture enables loss of power to a particular area to be less impactful on network lighting control system.

PART 3 EXECUTION

3.1 INSTALLATION OF WIRING

- A. Wiring Method: Comply with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables".
 - 1. Comply with requirements for raceways and boxes specified in Section 26 05 33 - Raceway and Boxes for Electrical Systems"

- B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.2 IDENTIFICATION

- A. Identify system components, wiring, cabling, boxes, cabinets, and terminals. Comply with identification requirements specified in Section 26 05 53 "Identification for Electrical Systems."

- B. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with Section 26 05 53 "Identification for Electrical Systems."

- C. Identify all controls with device address.
- D. Label each device cable within 6 inch (152 mm) of connection to bus power supply or termination block.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
 - 1. Test continuity of each circuit.
- B. Field tests and inspections must be witnessed by **Architect**.
- C. Tests and Inspections: **Engage a factory-authorized service representative to perform test inspections.**
 - 1. Test each zone using local and remote control hardware.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters.
- D. Nonconforming Work:
 - 1. Lighting controls will be considered defective if they do not pass tests and inspections.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise replace with new units and retest.
- E. Field Test Reports: Engage a factory-authorized service representative to prepare field test reports.
 - 1. Prepare functionality and inspection reports, including a certified report that identifies controls included and describes test results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.
 - 2. Include list of all points created from actual tests of all addressed control points for lamps, ballasts, manual controls, and sensors.

3.4 REMOTE ACCESS

- A. Digital network lighting control system capable of remote access by manufacturer with the following features:
 - 1. System diagnostics including detection of fault condition in hardware or connected devices.
 - 2. Access to all connected devices for complete programming including scheduling of time-of-day events and device parameters necessary to meet required sequence of operations.
 - 3. Browser-based interface to verify system functionality.
 - 4. On-demand access to manufacturer technical support for remote troubleshooting, diagnostics, configuration, and programming.
 - 5. Owner training on the digital network lighting control system available remotely.
- B. Remote access system fully functional over commercial cellular connection or Internet-connected ethernet network.
- C. All hardware associated with remote access including cellular modem and cellular antenna are to remain on-site regardless of warranty or cellular contract status.

3.5 SYSTEM STARTUP

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks in accordance with manufacturer's published

instructions.

2. Activate luminaires and verify that all maximum output levels match output levels detailed in an Owner-approved sequence of operations.
 3. Confirm correct communications wiring, initiate communications between control devices and controller/gateways, and program the lighting control system in accordance with approved configuration schedules, time-of-day schedules, and input override assignments.
 4. Program network devices to meet required sequence of operations.
 5. Program and verify all sequence of operations.
 6. Create backup of system programming.
 7. Assist in installation of system software on customer-provided workstation or server.
 8. Verify bidirectional communication of manufacturer-provided cellular router with manufacturer-managed remote access portal.
- B. Commissioning Walkthrough: **Engage factory-authorized service representative to collaborate with third-party commissioning agent** to demonstrate lighting control system functionality and verify the system meets the specified Project requirements.

3.6 CLOSEOUT ACTIVITIES

- A. Enhanced Documentation: Engage lighting system manufacturer to provide comprehensive system documentation including detailed programming, sequence of operation data per Project specifications, and related code requirements.
- B. Training: Engage lighting system manufacturer to provide comprehensive system overview, software overview, and documentation relating to system operation and maintenance.

3.7 PROTECTION

- A. After installation, protect digital network lighting controls from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

3.8 MAINTENANCE

- A. Engage a factory-authorized service representative to perform on-site system adjustments.
1. On-Site Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site settings adjustments to suit actual occupied conditions. Provide up to **two** visits to Project during other-than-normal occupancy hours for this purpose.
 2. Prepare and submit report after each visit that details activities performed.
- B. Engage a factory-authorized service representative to perform remote system adjustments.
1. Remote Occupancy Adjustments: When requested within 12 months from date of Substantial Completion and project registration with lighting control system manufacturer, provide remote settings adjustments to suit actual occupied conditions. Provide up to 2 sessions to Project during other-than-normal occupancy hours for this purpose.
 - a. System to include manufacturer-provided cellular communication hardware and connection to the system for a minimum of 12 months after substantial completion to allow for factory representative assistance with settings adjustments and system sustainment.
 - b. For the remaining duration of the maintenance term, or in the event cellular connectivity is not available, manufacturer assistance must be available through an Owner-provided, Internet-connected network.

2. Prepare and submit report after each session that details activities performed.
- C. Maintenance Service Agreement:
1. Beginning at Substantial Completion, verify that maintenance service agreement includes 12 months' full maintenance by manufacturer's authorized service representative.
 2. Preventative maintenance to include:
 - a. System diagnostic reports.
 - b. System performance checks.
 - c. Device firmware updates.
 - d. Programming adjustment as required for proper lighting system operation.
 - e. Expedited factory direct warranty processing, replacement, and programming of defective components.
 3. Verify that parts and supplies are manufacturer's authorized replacement parts and supplies.

END OF SECTION 26 09 43.13

SECTION 26 27 26 - WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section Includes:
 - 1. Wiring devices.
- B. Related Sections:
 - 1. Section 26 05 00: Common Work Results for Electrical.
 - 2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
 - 3. Section 26 05 26: Grounding and Bonding for Electrical Systems.
 - 4. Section 26 05 33: Raceway and Boxes for Electrical Systems.
- C. Reference Standards:
 - 1. California Electrical Code (CEC). California Code of Regulations, Title 24, Part 3.
 - 2. National Electrical Manufacturers Association (NEMA):
 - a. WD 1 General Color Requirements for Wiring Devices.
 - b. WD 6 Wiring Devices - Dimensional Specifications.
 - 3. National Electrical Manufacturers Association (NECA):
 - a. 1 Good Workmanship in Electrical Construction.
 - 4. National Electrical Testing Association (NETA):
 - a. ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
 - 5. Underwriters Laboratories, Inc. (UL):
 - a. 20 Safety General-Use Snap Switches.
 - b. 231 Standard for Power Outlets.
 - c. 498 Attachment Plugs and Receptacles.
 - d. 943 Ground-Fault Circuit-Interrupters.
 - e. 1436 Standard for Outlet Circuit Testers and Similar Indicating Devices.
 - f. 1472 Solid-State Dimming Controls.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Receptacles, Switches, Wall Plates:
 - 1. Cooper Wiring Devices; Division of Cooper Industries, Inc.
 - 2. Hubbell Incorporated; Wiring Device-Kellems.
 - 3. Leviton Mfg. Company, Inc.
 - 4. Pass & Seymour/ Legrand.

2.2 RECEPTACLES

- A. General for all receptacles:
 - 1. Device shall be listed by UL
 - 2. Mounting straps shall be plated steel, with break-off plaster ears and shall include a

- self-grounding feature (this feature does not substitute for a grounding conductor terminated on grounding strap of device). Terminal screws shall be brass, brass plated or a copper alloy metal.
3. Receptacles shall be of a screw terminal type, "pressure type quick wire" terminations are not allowed.
- B. Duplex receptacles shall be premium specification grade single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have bussing break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal:
1. Wiring device color shall be standard white. Contractor to verify device color with Architect prior to procurement.
 2. Ground Fault Interrupter Duplex Receptacles - Shall be an integral unit suitable for mounting in a standard outlet box:
 - a. Ground fault interrupter shall be commercial grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120 volt, 20-ampere branch circuit. Device shall meet CEC requirements. Device shall have a minimum nominal tripping time of 1/30th of a second. Devices shall meet UL 943.
- C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete and match with appropriate cord grip plug. Devices shall meet UL 231.
- D. Weatherproof Receptacles: Shall consist of a listed weather resistant duplex receptacle, mounted in box with a gasketed, while in use weatherproof, cast metal cover plate and cap receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap.

2.3 SWITCHES

- A. Toggle switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles color to match receptacle device color unless otherwise specified:
1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self-grounding mounting strap with break-off plaster ears and be of a screw terminal type.
 2. Shall be color coded for current rating, listed by UL, and meet the requirements of NEMA WD 1, Heavy-Duty and UL20.
 3. Ratings:
 - a. 120 volt circuits: 20 amperes at 120-277 volts AC.
 - b. 277 volt circuits: 20 amperes at 277 volts AC.
 4. The switches shall be mounted on the strike plate side of doors.
 5. Incorporate barriers between switches with multi-gang outlet boxes where required by the CEC.
 6. All toggle switches shall be of the same manufacturer.

2.4 WALL PLATES

- A. Wall plates for switches and receptacles shall be type 302 stainless steel.
- B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD1.
- C. For receptacles or switches ganged together, wall plates shall be a single ganged plate.
- D. Wall plates for data, telephone or other communication outlets shall be as specified in the

associated specification.

- E. Surface mounted boxes, NEMA1, shall be industrial grade raised galvanized steel covers. In shop areas, all receptacles shall be dust proof and or waterproof where applicable.
- F. Waterproof device covers shall be cast iron, 4-corner screw type, for FS and FD type mounting. Device covers shall be zinc galvanized finish. Weatherproof covers shall be lockable.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with the CEC, NECA "Standard of Installation", and as shown as on the drawings.
- B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also be connected to the green equipment grounding conductor.
- C. General: Devices shall be of the type specified herein. All devices shall be installed with "pigtailed" leads from the outlet box. No device shall be used in the "feed through" application. Screw terminals shall be used to connect all devices to the circuit and shall be grounded by means of a ground wire where grounding terminals are provided in the device.
- D. Installation: Devices and plates shall be installed in a "plumb" condition and must be flush with the finish surface of the wall where boxes are recessed.
- E. Mounting heights: All control and convenience devices shall comply with California Code of Regulations Title 24, ADA, and CBC with respect to accessibility requirements. Mounting heights indicated on plans shall have precedence.
- F. Install switches with the off position down.
- G. Clean debris from outlet boxes.
- H. Provide extension rings as required to bring outlet boxes flush with finished surface or casework.
- I. Test each receptacle device for proper polarity.

END OF SECTION 26 27 26

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section Includes:
 - 1. Interior lighting systems, including luminaires, LED's, and emergency lighting equipment.
- B. Related Sections:
 - 1. Section 26 05 00: Common Work Results for Electrical.
 - 2. Section 26 05 19: Low-Voltage Electrical Power Conductors and Cables.
 - 3. Section 26 05 26: Grounding and Bonding for Electrical Systems.
 - 4. Section 26 05 33: Raceway and Boxes for Electrical Systems.
- C. Reference Standards:
 - 1. California Electrical Code (CEC) based on NFPA 70 (NEC). California Code of Regulations, Title 24, Part 3.
 - 2. California Energy Code. California Code of Regulations, Title 24, Part 6.
 - 3. National Electrical Manufacturers Association (NEMA).
 - a. 50 Enclosures for Electrical Equipment.
 - b. 67 Panelboards.
 - c. 489 Molded Case Circuit Breakers and Circuit Breaker enclosures.
 - 4. Underwriters Laboratories, Inc. (UL).
 - a. 50 Enclosures for Electrical Equipment.
 - b. 67 Panelboards.
 - c. 489 Molded Case Circuit Breakers and Circuit Breaker enclosures.
 - 5. Aluminum Association Inc. (AA).
 - 6. Illuminating Engineering Society of North America (IESNA or IES).

1.3 SUBMITTALS

- A. Submit in accordance with Section 26 05 00: Common Work Results for Electrical.
- B. Shop Drawings:
 - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
 - 2. Include electrical ratings, dimensions, mounting, details, materials, terminations, wiring and connection diagrams, photometric data, ballasts, luminaires, lamps, and controls.

1.4 DEFINITIONS

- A. Lighting terminology used herein is defined in IES.
- B. Exception: The term "driver" is used herein to cover both drivers and power supplies, where applicable.
- C. Clarification: The term "LED light source(s)" is used herein per IES to cover LED

package(s), module(s), and array(s).

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be in accordance with CEC, UL, ANSI, and as shown on the drawings and specified.

2.2 LIGHTING FIXTURES (LUMINAIRES)

- A. Shall be in accordance with CEC, UL 1598 and shall be as shown on drawings and as specified. All luminaires shall have been certified to the California Energy Commission by its manufacturer to comply with the efficiency standards as per California Code of Regulations Title 24, Part 6, Section 111 referencing the Appliance Efficiency Regulations in Title 20. Post certification with building permit.
- B. Sheet Metal:
1. Shall be formed to prevent warping and sagging. Housing, trim, and lens frame shall be true, straight (unless intentionally curved) and parallel to each other as designed.
 2. Wireways and fittings shall be free of burrs and sharp edges and shall accommodate internal and branch circuit wiring without damage to the wiring.
 3. When installed, any exposed fixture housing surface, trim frame, door frame and lens frame shall be free of light leaks; lens doors shall close in a light tight manner:
 - a. Hinged door closure frames shall operate smoothly without binding when the fixture is in the installed position, and latches shall function easily by finger action without the use of tools.
- C. Recessed fixtures shall be of the type approved for the ceiling and insulation conditions and appropriate for the installation location. Insulation must be held back from the fixture to provide manufacturers' recommended clearances for proper operation. Thermal tripping shall be the installer's responsibility to correct. Where installed in fire rated ceilings, coordinate installation of fire rated enclosures around the ceiling penetrations. Fixtures shall contain the proper through wiring capacity for that which is shown on the plans.
- D. Recessed fixtures shall be provided with the appropriate trims and hardware compatible with the ceiling type shown. Plaster frames are required where plaster or gypsum board ceilings are encountered.
- E. Fixtures with louvers or light transmitting panels shall have hinges, latches, and safety catches to facilitate safe, convenient cleaning and relamping.
- F. Mechanical Safety: Lighting fixture closures (lens doors, trim frame, hinged housings, etc.) shall be retained in a secure manner by captive screws, chains, captive hinges, or fasteners such that they cannot be accidentally dislodged during normal operation or routine maintenance.
- G. Metal Finishes:
1. The manufacturer shall apply standard finish (unless otherwise specified) over a corrosion resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt, and other deposits. Edges of pre-finished sheet metal exposed during forming, stamping, or shearing processes shall be finished in a similar corrosion resistant manner to match the adjacent surface(s). Fixture finish shall be free of stains or evidence of rusting, blistering, or flaking.
 2. Interior light reflecting finishes shall be white with not less than 85 percent

- reflectance's, except where otherwise specified on the drawing.
3. Exterior finishes shall be as shown on the drawings.
- H. Provide all lighting fixtures with a specific means for grounding metallic wireways and housings to an equipment grounding conductor.
- I. Light Transmitting Components for Fixtures:
1. Shall be 100 percent virgin acrylic plastic or water white, annealed, crystal glass.
 2. Flat lens panels shall have not less than 1/8 inch of average thickness. The average thickness shall be determined by adding the maximum thickness to the minimum unpenetrated thickness and dividing the sum by 2.
 3. Unless otherwise specified, lenses, diffusers and louvers shall be retained firmly in a metal frame by clips or clamping ring in such a manner as to allow expansion and contraction of the lens without distortion or cracking.
- J. Recessed compact LED fixtures shall be manufactured specifically for LED lamps with drivers integral to the fixture. Assemblies designed to retrofit fixtures are prohibited except when described in this fashion.

2.3 LED LUMINAIRE REQUIREMENTS

- A. General Requirements:
1. Luminaire shall have an external label per ANSIC136.15.
 2. Luminaire shall have an internal label per ANSIC136.22.
 3. Luminaires shall start and operate in -20°C to +40°C ambient.
 4. LED light source(s) and driver(s) shall be RoHS compliant.

2.4 EMERGENCY FIXTURE POWER SUPPLY

- A. Self-contained battery-operated power supply for operating specified fixture for a minimum output of 90 minutes.
- B. The power supply shall be installed within the luminaire ballast compartment or wireway. Provide with test switch and charge indicator installed integral to the luminaire. The test switch and charge indicator may be installed in a remote ceiling mounted flush J-box for recessed downlights which cannot accept integral components.
- C. Performance: Emergency operation lumen output for specified fixtures shall be a minimum of 600 lumens.

2.5 LED DRIVER

- A. Driver:
1. Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperatures as indicated.
 2. Shall accept the voltage or voltage range indicated and shall operate normally for input voltage fluctuations of plus or minus 10 percent. Consistent with NEMA SSL 1.
 3. Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.
- B. Electromagnetic interference:
1. Shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
 2. Shall comply with FCC 47 CFR part 15 non-consumer RFI/ EMI standards.

- C. The following shall be in accordance with corresponding sections of ANSIC136.37:
 - 1. Wiring and grounding.
 - 2. All internal components shall be assembled and pre-wired using modular electrical connections.
 - 3. Mounting provisions.
 - 4. Terminal blocks for incoming AC lines.
 - 5. Latching and hinging.
 - 6. Ingress protection.

2.6 LAMPS

- A. Led Light Source:
 - 1. Minimum Color Rendering Index (CRI): 60.
 - 2. Correlated Color Temperature (CCT):
 - a. CCT shall be as listed in Table 1 below:

Table 1. Allowable CCT

Manufacturer-Rated Nominal CCT (K)	Allowable LM-79 Chromaticity Values Measured CCT (K)
2700	2580 to 2870
3000	2870 to 3220
3500	3220 to 3710
4000	3710 to 4260
4500	4260 to 4746
5000	4745 to 5311
5700	5310 to 6020
6500	6020 to 7040

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation and furnishing of lighting fixtures shall be in accordance with the CEC, manufacturer's instructions and as shown on the drawings or specified. Fixtures damaged in transit and storage prior to completion shall be replaced at Contractor's expense.
- B. Align, mount and level the lighting fixtures uniformly.
- C. Avoid interference with and provide clearance for equipment. Where the indicated locations for the lighting fixtures conflict with the locations for equipment, change the locations for the lighting fixtures by the minimum distances necessary as approved by the Architect. The Architectural reflected ceiling plan will take precedence over electrical plans.
- D. For suspended lighting fixtures, the mounting heights shall provide the clearances between the bottoms of the fixtures and the finished floors as shown on the drawings.
- E. Lighting Fixture Supports:

1. Contractor shall provide support for all of the fixtures independent of suspended ceilings. Supports may be anchored to channels of the ceiling construction, to the structural slab or to structural members within a partition, or above a suspended ceiling.
 2. Shall maintain the fixture positions after cleaning and re-lamping.
 3. Shall support the lighting fixtures without causing the ceiling or partition to deflect.
 4. Hardware for recessed fluorescent fixtures:
 5. Fixtures shall be supported as detailed on drawings and as required by DSA standards.
 6. Installation: Fixtures shall be securely mounted on ceilings and walls with appropriate fastening devices. "Drop-in" type T-bar fixtures shall be secured with #12 gauge safety "earthquake wires" as described by California Code of Regulations Title 24 Part 2, Chapter 47. "Tek Screws" will be required for fastening to the T-bar system in addition to safety wire. Surface mounted fluorescent fixtures shall be solidly screwed or clipped into framing above drywall with 4-#10 sheet metal screws into each fixture. Provide blocking for screw supports behind all surface mounted lighting fixtures weighing more than 15 lbs.
 7. Surface mounted lighting fixtures:
 - a. Fixtures shall be bolted against the ceiling independent of the outlet box at four points spaced near the corners of each unit. The bolts shall be minimum 1/4-20 bolt, secured to structural ceiling. Non-turning studs may be attached to the building structure by 12 gauge safety hangers.
 8. Fixtures mounted in open construction shall be secured directly to the building structure with approved bolting and clamping devices.
 9. Single or double pendent mounted lighting fixtures:
 - a. Each stem shall be supported by an approved outlet box, mounted swivel joint and canopy which holds the stem captive and provides spring load (or approved equivalent) dampening of fixture oscillations. Outlet box shall be supported vertically from the building structure and be allowed to swing to a 45 degree angle.
 10. Outlet boxes for support of lighting fixtures (where permitted) shall be secured directly to the building structure with approved devices or supported vertically in a hung ceiling from the building structure with a nine gauge wire hanger and be secured by an approved device to a main ceiling runner or cross runner to prevent any horizontal movement relative to the ceiling.
- F. Coordinate between the electrical and ceiling trades to ascertain that approved lighting fixtures are furnished in the proper sizes and installed with the proper devices (hangers, clips, trim frames, flanges), to match the ceiling system being installed.
- G. Bond lighting fixtures and metal accessories to the grounding system as specified in Section 26 05 26: Grounding and Bonding for Electrical Systems.
- H. Provide unswitched leg of interior lighting branch circuit to integral emergency battery pack light fixtures, exit signs and night lights as applicable per lighting plans.
- I. Wallmount fixtures in walkway areas shall not project more than 4 inches from wall when projection occurs lower than 80 inches.

END OF SECTION 26 51 00