

# Saddleback College Swimming Pool Refurbishment

tBP Project No. 21057.00

DSA #04-120421

File # 30-C5

Bid No:

South Orange County Community College District  
Mission Viejo, California

## Construction Documents

Volume 1 of 1  
Divisions 00 - 32  
October 2021

Architect:

tBP/Architecture  
4611 Teller Ave. Newport Beach, CA 92660-2104  
949. 673. 0300

tBP

Architecture  
Planning  
Interiors  
Management



**SECTION 00 01 01  
PROJECT TITLE PAGE**

**FOR**

**SWIMMING POOL REFURBISHMENT**

**PROJECT NUMBER: 21057.00**

**SOUTH ORANGE COUNTY COMMUNITY COLLEGE DISTRICT**

**28000 MARGUERITE PARKWAY, MISSION VIEJO CA92692**

**WWW.SOCCCD.EDU**

**PROJECT LOCATION**

**SADDLEBACK COLLEGE**

**28000 MARGUERITE PARKWAY**

**MISSION VIEJO , CALIFORNIA 92692**

**PREPARED BY:**

**ARCHITECT**

**TBP/ARCHITECTURE**

4611 Teller Avenue, Newport Beach CA 92660

949.673.0300

[www.ltbparchitecture.com](http://www.ltbparchitecture.com)

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NOTICE: This Project Manual, is an unpublished instrument of service of the authors. It is prepared for use only on this Project and in conjunction with the authors' interpretations, observations, decisions and administration, as described in the Conditions of the Contract. Desired results without these services cannot be assured. Use in whole or in part, without the authors' services and expressed written consent may violate Act 17 U.S.C. par. 301 (1991).

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**SECTION 00 01 02  
PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 PROJECT IDENTIFICATION**

- A. Project Name: Swimming Pool Refurbishment, located at:  
Project Number: 21057.00.  
Saddleback College.  
28000 Marguerite Parkway.  
Mission Viejo, California 92692.
- B. The Owner, hereinafter referred to as District: South Orange County Community College District

**South Orange County Community College District**

28000 Marguerite Parkway, Mission Viejo CA 92692  
www.socccd.edu  
949.582.4850

**1.02 NOTICE TO PROSPECTIVE BIDDERS**

- A. These documents constitute an Invitation to Bid to and request for qualifications from General Contractors for the construction of the project described below.

**1.03 PROJECT DESCRIPTION**

- A. Summary Project Description: modernization with related site work.
- B. Contract Scope: Construction, demolition, and renovation.
- C. Contract Terms: Lump sum (fixed price, stipulated sum).

**1.04 PROJECT CONSULTANTS**

- A. The Architect, hereinafter referred to as Architect: **tBP/Architecture**  
4611 Teller Avenue, Newport Beach CA 92660  
www.ltbparchitecture.com  
949.673.0300

**1.05 PROCUREMENT DOCUMENTS**

- A. Availability of Documents: Complete sets of procurement documents may be obtained:
  - 1. From District at the Project Manager's address listed above.

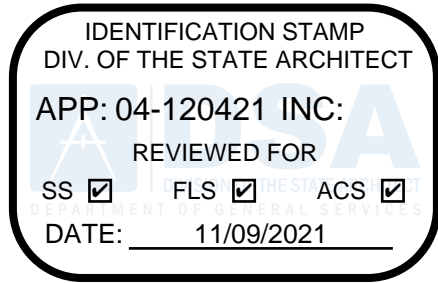
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**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

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**SECTION 00 01 07  
SEALS PAGE**

**ARCHITECT OF RECORD (AOR)**

**TBP/ARCHITECTURE**

4611 Teller Avenue, Newport Beach CA 92660  
Gary Moon C-25409



**ELECTRICAL ENGINEER OF RECORD (EEOR)**

**FBA ENGINEERING**

150 Paularino Avenue, Suite A120, Costa Mesa CA 92626  
Stephen R. Zajicek E-10372



**CIVIL ENGINEER OF RECORD (CEOR)**

**FPL & ASSOCIATES**

30 Corporate Park, Suite 401, Irvine, California 92606  
Alan Wing-Chi Lee, CE C-34971



**POOL CONSULTANT**

**AQUATIC DESIGN GROUP**

2226 Faraday Avenue, Carlsbad, California 92008  
Gregory Ferrell C-35802



**END OF SECTION**

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**SECTION 01 10 00  
SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: Swimming Pool Refurbishment.
- B. District's Name: South Orange County Community College District.
- C. Architect's Name: tBP/Architecture.
- D. The Project consists of the alteration of existing pool, equipment replacement, and related site work located at Saddleback College.

**1.02 CONTRACT DESCRIPTION**

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Owner-Contractor Agreement.
- B. The Work: The Work is construction and related services for a , CBC, Occupancy Type Business Group B, Construction Type II-B, , totaling approximately 2,339 square feet.

**1.03 CONTRACT DOCUMENTS**

- A. Contract Requirements:
  - 1. Conditions of the Contract and other Contract documents have been included in the Project Manual, as indicated in the Table of Contents.
    - a. Such documents are not Specifications.
  - 2. Specifications are found in Divisions 1 through 33 of the Project Manual.
- B. Contract Drawings: The Drawings provided with and identified in the Project Manual are the Drawings referenced in the Agreement.
  - 1. The location, extent and configuration of the required construction and improvements are shown and noted on Drawings.
    - a. The Drawings are referenced in the Agreement.
    - b. An index of Drawings is included in the set of Drawings.
  - 2. Drawings are arranged into series according to design discipline. Such organization and all references to trades, subcontractor, specialty contractor or supplier shall not control the Contractor in dividing the Work among subcontractors or in establishing the extent of the Work to be performed by any trade.
  - 3. Where the terms "as shown", "as indicated", "as noted", "as detailed", "as scheduled", or terms of like meaning, are used in the Drawings or Specifications, it shall be understood that reference is being made to the Drawings referenced in the Agreement.
  - 4. Where reference to the word "plans" is made anywhere in Drawings, Specifications and related Contract Documents, it shall be understood to mean the Drawings referenced in the Agreement.

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- C. Contract Specifications: The Specifications provided in the Project Manual are the Specifications referenced in the Agreement.
  - 1. Specifications are organized by Divisions and Sections in accordance with the recommended practices of the Construction Specifications Institute.
    - a. Such organization shall not control the Contractor in dividing the Work among subcontractors or in establishing the extent of Work to be performed by any trade.
  - 2. Specifications are included in the Project Manual, which may also include other Bidding and Contract Documents.
    - a. Contents of the Project Manual are listed in Document 00 01 10 - Table of Contents, in the Project Manual.

**1.04 DESCRIPTION OF ALTERATIONS WORK**

- A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 41 00.
  - 1. The intent of these drawings and specifications are the work of the alteration, rehabilitation, or reconstruction of this facility shall be submitted and approved by DSA before proceeding with the repair work. CAC Section 4-317.
- B. Scope of alterations work is indicated on drawings.
- C. Renovate the following areas, complete including operational mechanical and electrical work and finishes:
- D. Plumbing: Alter existing system and add new construction, keeping existing in operation.
- E. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.

**1.05 WORK BY OWNER**

- A. Concurrent Work Under Separate Contracts:
  - 1. Work Under Separate Contracts: District will award separate contracts for products and installation for interior improvements and other work as may be indicated on Drawings as NIC (Not in Contract).
  - 2. Relationship to Work Under the Contract:
    - a. Work under the Contract shall include all provisions necessary to make such concurrent work under separate contracts complete in every respect and fully functional, including field finishing.
    - b. Provide necessary backing, supports, piping, conduit, conductors and other such provisions from point of service to point of connection, as shown on Drawings and specified herein.
  - 3. Related Contract Documents:
    - a. District will make available, in a timely manner, drawings and specifications of work under separate contracts for coordination and further description of that work.
    - b. Such drawings and other data required for the coordination of the work of separate contracts with the Work of this Contract may be included with the Contract Documents.

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- c. If so, they are provided for convenience only and are not to be considered Contract Documents produced by Architect or Architect's consultants.
  - 4. Permits, Notices and Fees:
    - a. Permits, Notices and Fees: Notices required by and approvals required of authorities having jurisdiction for work under separate contracts and related fees will be solely the responsibility of District.
- B. Items noted NIC (Not in Contract) will be supplied and installed by District before Substantial Completion. Some items include:
  - 1. Movable cabinets.
  - 2. Furnishings.
  - 3. Small equipment.
  - 4. Artwork.
- C. District will supply the following for installation by Contractor:
  - 1. Owner-Furnished Products: District may furnish, for installation by Contractor, products which are identified on the Drawings and in the Specifications as OFCI (Owner-Furnished/Contractor-Installed).
  - 2. Relationship to Work Under the Contract:
    - a. Work under the Contract shall include all provisions necessary to fully incorporate such products into the Work, including, as necessary:
      - 1) Fasteners.
      - 2) Backing,.
      - 3) Supports.
      - 4) Piping.
      - 5) Conduit.
      - 6) Conductors.
      - 7) Other such provisions from point of service to point of connection.
      - 8) Field finishing, as shown on Drawings and specified herein.
    - b. See Section 01 30 00 - Administrative Requirements for additional requirements.

**1.06 PERMITS, LICENSES AND FEES**

- A. Permits:
  - 1. For Work included in the Contract, Contractor shall obtain all permits from authorities having jurisdiction and from serving utility companies and agencies.
  - 2. District will reimburse Contractor for amount charged for such permits, without mark-up.
  - 3. For Work performed under design/build basis, plancheck and permit fees shall be included in the Contract Sum.
- B. Licenses:
  - 1. Contractor shall obtain and pay all licenses associated with construction activities, such as business licenses, contractors' licenses and vehicle and equipment licenses.

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- 2. All costs for licenses shall be included in the Contract Sum.
- C. Assessments:
  - 1. District will pay all assessments and utility service connection fees. Costs of assessments shall not be included in the Contract Sum.
- D. Test and Inspection Fees:
  - 1. Contractor shall pay all fees charged by authorities having jurisdiction and from serving utility companies and agencies, for tests and inspections conducted by those authorities, companies and agencies.
  - 2. District will reimburse Contractor for actual amount of such fees, without mark-up.
  - 3. Refer to Section 01 40 00 - Quality Requirements for additional information on tests and inspections and responsibility for payment of fees.

**1.07 OWNER OCCUPANCY**

- A. District intends to continue to occupy adjacent portions of the existing site during the entire construction period.
- B. District intends to occupy the Project upon Substantial Completion.
- C. District intends to occupy a certain portion of the Project prior to the completion date for the conduct of normal operations.
- D. Cooperate with District to minimize conflict and to facilitate District's operations.
- E. Schedule the Work to accommodate District occupancy.

**1.08 CONTRACTOR USE OF SITE AND PREMISES**

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Arrange use of site and premises to allow:
  - 1. District occupancy.
  - 2. Work by Others.
  - 3. Work by District.
  - 4. Use of site and premises by the public.
- C. Provide access to and from site as required by law and by District:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Site Access:
    - a. Limit access to site to indicated routes and access points as indicated.
    - b. If routes and access points are not indicated, access shall be as approved by District.
    - c. Do not restrict access to adjacent properties and do not restrict access for those performing work under separate contracts for the District.
  - 3. Do not obstruct roadways, sidewalks, or other public ways without permit.
  - 4. Construction Limit:

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- a. Limit construction activities to areas indicated on Drawings as Project Area or, if not indicated, to areas within the parcel as described in the legal description on the Drawings.
  - b. Refer also to Section 01 50 00 - Temporary Construction Facilities and Controls for additional requirements.
- D. Existing building spaces may not be used for storage.
- E. Time Restrictions:
- 1. Limit conduct of especially noisy, malodorous, and dusty exterior work to the hours of 7 AM to 6 PM.
- F. Utility Outages and Shutdown:
- 1. Limit disruption of utility services to hours the site is unoccupied.
  - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to District and authorities having jurisdiction.
  - 3. Prevent accidental disruption of utility services to other facilities.

**1.09 CONSTRUCTION WASTE MANAGEMENT**

- A. Construction and waste management, complying with Section 01 74 19 - Construction Waste Management and Disposal, is a requirement for this project.
- B. The Contractor, Prime Contractors, and subcontractors all have obligations in meeting the requirements of this specification.

**END OF SECTION**

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**SECTION 01 20 00  
PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 78 00 - Closeout Submittals: Project record documents.

**1.03 SCHEDULE OF VALUES**

- A. Use Schedule of Values Form:
  - 1. Form provided by District.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 15 days after date established in Notice to Proceed.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- G. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- H. Revise schedule to list approved Change Orders, with each Application For Payment.
  - 1. List each authorized Change Order as an extension on the continuation sheet, listing the Change Order number and dollar value as for an original portion of Work.

**1.04 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
  - 1. Substantiating information will normally be required only for those portions of Work whose completion state cannot be readily determined by observation of the completed Work.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.

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- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Authorized Change Orders.
  - 7. Total Completed and Stored to Date of Application.
  - 8. Balance to Finish.
  - 9. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
  - 1. No Change Orders shall be included with Application for Payment until approved in writing by District and Architect. Also approved by DSA when appropriate.
- I. Submit one electronic and three hard-copies of each Application for Payment.
- J. Include the following with the application:
  - 1. Transmittal letter as specified for submittals in Section 01 30 00.
  - 2. Construction progress schedule, revised and current as specified in Section 01 30 00.
  - 3. Current construction photographs specified in Section 01 30 00.
  - 4. Partial release of liens from major subcontractors and vendors.
    - a. Provide with each Application for Payment lien releases from all subcontractors, workers and materials suppliers employed for the Project covering their portion of Work to date for which payment application is made. Lien release forms will be provided by District and shall be completed in accordance with directions provided.
  - 5. Project record documents as specified in Section 01 78 00, for review by District which will be returned to the Contractor.
  - 6. Affidavits attesting to off-site stored products.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

**1.05 ADDENDA**

- A. Addenda are changes issued prior to the signing of the Contract for Construction. These Addenda shall be signed by the Architect and approved by the (Project City).

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- B. These documents may or may not have approved by the (Project City) prior to the close of Bid.
  - 1. If not approved by DSA prior to close of the bidding period, the contract price shall include the Addenda.
  - 2. No work shall proceed regarding any Addendum until approved by DSA.
  - 3. Revisions to Addenda, when approved by DSA, shall be incorporated by an additional addendum or Change Order as indicated below and as provided for in the Contract for Construction and General Conditions.

**1.06 MODIFICATION PROCEDURES**

- A. Construction Changes, General:
  - 1. The following describe administrative procedures to be followed in compliance with provisions of the Conditions of the Contract for Architect's Supplemental Instructions, Construction Change Directives, Construction Change Documents, and Contract Change Orders.
  - 2. The Architect will prepare and issue a Bulletin on which the Architect's Supplemental Instructions, a Construction Change Directive or a Request for Proposal will be presented to the Contractor for action.
- B. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.
- C. Contract Change Order Forms: Form as directed by District.
- D. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
  - 1. Architect's Supplemental Instructions:
    - a. Minor changes in the Work, not involving an adjustment in either the Contract Sum or Contract Time, as authorized by the Conditions of the Contract, will be presented by the Architect using the Architect's Bulletin form.
    - b. Should the Architect's Supplemental Instructions result in disputed costs and time adjustments, such dispute shall be resolved in accordance with the provisions of the Conditions of the Contract.
- E. For other required changes, not involving structural, accessibility, or fire-life-safety portions of approved Drawings and Specifications, Architect will issue a document signed by District instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  - 2. Promptly execute the change.
  - 3. DSA Construction Change Document approval for substitutions and changes to structural, accessibility, or fire-life-safety portions of approved Drawings and Specifications is required from DSA prior to fabrication and installation. CAC Section 4-215, 4-233(c), & 4-338(c).
    - a. The approved Construction Change Document shall be signed by:

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- 1) Architect of Record.
  - 2) When applicable:
    - (a) Structural Engineer of Record.
    - (b) Mechanical Engineer of Record.
    - (c) Electrical Engineer of Record.
    - (d) Civil Engineer of Record.
    - (e) Delegated Professional Engineer.
  - 3) Division of the State Architect for final approval.
4. Construction Change Directives: In accordance with provisions of the Conditions of the Contract, the District may direct the Contractor to proceed with a change in the Work prior to formal preparation, review and agreement of a Contract Change Order, in order to not delay construction.
- a. The Architect will prepare and issue a change document containing a Construction Change Directive which, when signed by the District and the Architect, shall instruct the Contractor to proceed with a change in the Work, for subsequent inclusion in a Contract Change Order.
  - b. Should the Construction Change Directive result in disputed costs and time adjustments, such dispute shall be resolved in accordance with the provisions of the Conditions of the Contract.
  - c. Construction Change Directives shall follow procedures specified below for Contract Change Orders except that Contractor shall immediately proceed with the change upon receipt of the signed Change Directive.
- F. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
1. Such Request for Proposal may include an estimate of additions or deductions in Contract Time and Contract Sum for executing the change and may include stipulations regarding overtime work and the period of time the requested response from the Contractor shall be considered valid.
- G. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6000.
1. After review of the request and with the District's approval, the Architect will prepare a change document containing a Request for Proposal, as described above.
  2. Issuance of such a request by the Architect shall not indicate authorization of the Contractor to proceed with the proposed change.
  3. Changes will be approved only by an approved Construction Change Directive and Contract Change Order.

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- H. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
  3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
  4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- I. Substantiation of Costs: Provide full information required for evaluation.
1. On request, provide the following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
  3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
    - a. Cost and Time Resolution: If amounts for changes in Contract Sum and Contract Time cannot be agreed upon by District and Contractor, amounts shall be resolved in accordance with provisions of the Conditions of the Contract for resolution of disputes and the following:
      - 1) Contractor shall keep accurate records of time, both labor and calendar days, and cost of materials and equipment.
      - 2) Contractor shall prepare and submit an itemized account and supporting data after completion of changed Work, within the time limits indicated in the Conditions of the Contract.
      - 3) Contractor shall provide full information as required and requested, for District and Architect to evaluate and substantiate proposed costs and time for the change in the Work.
      - 4) When District and Contractor determine mutually acceptable amounts for changes in Contract Sum and Contract Time, a Contract Change Order shall be executed for these amounts.

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- 5) District shall have the right to audit Contractor's invoices and bid quotations to substantiate costs for Contract Change Orders.
- J. Construction Changes Based on Stipulated Sum or Time: Based on the Contractor's response to a Request for Proposal or Construction Change Directive, the District and Architect will review the response.
  - 1. The District and Contractor shall negotiate a mutually acceptable adjustment in Contract Sum and Contract Time, as appropriate, prior to performance of the changed Work.
  - 2. A Contract Change Order for the stipulated amounts shall be prepared based on the stipulated sum and change in time.
- K. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
  - 1. When agreement is reached on changes, if any, in the Contract Time and the Contract Sum, the Contractor shall prepare a Contract Change Order using a form as directed by the District, with supplementary documents as necessary to describe the change and the associated costs and schedule impacts.
  - 2. Construction Change Document approval is required from DSA prior to fabrication and installation.
  - 3. Submit Contract Change Orders to District through the Architect.
  - 4. Contractor shall prepare and submit five original sets of documents for each Change Order. District, Architect and DSA shall sign the Change Order indicating acceptance and approval of the change.
    - a. Structural Engineer shall also sign the Change Order, when applicable.
  - 5. All Change Orders must be approved by DSA prior to fabrication and installation.
  - 6. Upon approval of the Change Order, Contractor shall promptly execute the change in the Work.
- L. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- M. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
  - 1. Contractor shall submit revised schedules at the next Application for Payment following approval and acceptance of the Contract Change Order.
- N. Promptly enter changes in Project Record Documents.

**1.07 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  - 1. All closeout procedures specified in Section 01 70 00.

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**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 25 00  
SUBSTITUTION PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedural requirements for proposed substitutions.

**1.02 RELATED REQUIREMENTS**

- A. Division 00 - Procurement and Contracting Requirements: Restrictions on timing of substitution requests.
- B. Section 00 43 25 - Substitution Request Form - During Procurement: Required form for substitution requests made prior to award of contract (During procurement).
- C. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.
- D. Section 01 60 00 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.
- E. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Restrictions on emissions of indoor substitute products.

**1.03 DEFINITIONS**

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
  - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
    - a. Unavailability.
    - b. Regulatory changes.
  - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
    - a. Substitution requests offering advantages solely to the Contractor will not be considered.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

- A. Requests by Contractor to deviate from specified requirements for products, materials, equipment, and methods, or to provide products other than those specified, shall be considered requests for substitutions except under the following conditions:
  - 1. Substitutions are requested during the bidding period, and accepted prior to execution of the Contract. Acceptance shall be in the form of written Addendum to the Bidding

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- documents or revision to the Drawings or Specifications for use as Construction Contract Documents.
2. Changes in products, materials, equipment, and methods of construction are directed by the District or Architect.
  3. Contractor options for provision of products and construction methods are specifically stated in the Contract Documents.
  4. Change in products, materials, equipment, and methods of construction is required for compliance with Codes, ordinances, regulations, orders and standards of authorities having jurisdiction.
- B. Substitution Provisions: Refer to substitution provisions of the Conditions of the Contract, in addition to the requirements specified herein. Provisions for consideration and acceptance of substitutions shall be as follows:
1. Documentation:
    - a. Substitutions will not be considered if they are indicated or implied on shop drawing, product data or sample submittals.
    - b. All requests for substitution shall be made by separate written request from Contractor.
  2. Cost and Time Considerations: Substitutions will not be considered unless a net reduction in Contract Sum or Contract Time results to the District's benefit, including redesign costs, life cycle costs, changes in related Work and overall performance of building systems.
  3. Design Revision:
    - a. Substitutions will not be considered if acceptance will require substantial revision of the Contract Documents or will substantially change the intent of the design, in the opinion of the Architect.
    - b. The intent of the design shall include functional performance and aesthetic qualities.
  4. Data: It shall be the responsibility of the Contractor to provide adequate data demonstrating the merits of the proposed substitution, including cost data and information regarding changes in related Work.
  5. Determination by Architect:
    - a. Architect will determine the acceptability of proposed substitutions and will notify Contractor, in writing within a reasonable time, of acceptance or rejection.
    - b. The determination by the Architect regarding functional performance and aesthetic quality shall be final.
  6. Non-Acceptance: If a proposed substitution is not accepted, provide the specified product.
    - a. If, in the opinion of the Architect, the substitution request is incomplete or has insufficient data to enable a full and thorough review of the intended substitution, the substitution may be summarily refused and determined to be unacceptable.
  7. Substitution Limitation: Only one request for substitution will be considered for each product.

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- C. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
    - a. Include a signed certification that the Contractor has:
      - 1) Reviewed the proposed substitution and has determined that the substitution is equivalent or superior in every respect to product requirements indicated or product specified in the Contract Documents.
      - 2) Certify the proposed substitution is suited for and can perform the purpose or application of the specified product indicated or specified in the Contract Documents.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
  - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to District.
  - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
    - a. Include a signed waiver by the Contractor for changes in the Contract Time or Contract Sum because of the following:
      - 1) Substitution failed to perform adequately.
      - 2) Substitution required changes in on other elements of the Work.
      - 3) Substitution caused problems in interfacing with other elements of the Work.
      - 4) Substitution was determined to be unacceptable by authorities having jurisdiction.
  - 6. Agrees to reimburse District and Architect for review or redesign services associated with re-approval by authorities.
- D. A Substitution Request for specified installer constitutes a representation that the submitter:
  - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- E. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
  - 1. Note explicitly any non-compliant characteristics.
- F. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
  - 1. Forms indicated and included in the Project Manual are adequate for this purpose, and must be used.
  - 2. No specific form is required. Contractor's Substitution Request documentation must include the following:
    - a. Project Information:

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- 1) Official project name and number, and any additional required identifiers established in Contract Documents.
  - 2) District's, Architect's, and Contractor's names.
- b. Substitution Request Information:
- 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
  - 2) Indication of whether the substitution is for cause or convenience.
  - 3) Issue date.
  - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
  - 5) Description of Substitution.
  - 6) Reason why the specified item cannot be provided.
  - 7) Differences between proposed substitution and specified item.
  - 8) Description of how proposed substitution affects other parts of work.
- c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
- 1) Physical characteristics.
  - 2) In-service performance.
  - 3) Expected durability.
  - 4) Visual effect.
  - 5) Sustainable design features.
  - 6) Warranties.
  - 7) Other salient features and requirements.
  - 8) Include, as appropriate or requested, the following types of documentation:
    - (a) Product Data:
    - (b) Samples.
    - (c) Certificates, test, reports or similar qualification data.
    - (d) Drawings, when required to show impact on adjacent construction elements.
  - 9) Include a detailed description, in written or graphic form as appropriate, indicating all changes or modifications needed to other elements of the Work and to construction to be performed by the District and by others under separate Contract with District, that will be necessary if the proposed substitution is accepted.
- d. Impact of Substitution:
- 1) Savings to District for accepting substitution.
    - (a) Include detailed cost data, including a proposal for the net change, if any, in the Contract Sum.
  - 2) Change to Contract Time due to accepting substitution.

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- (a) Indicate the substitution's effect on the Construction Schedule. Indicate the effect of the proposed substitution on overall Contract Time and, as applicable, on completion of portions of the Work for use by District or for work under separate contract by District.
- G. Limit each request to a single proposed substitution item.
  - 1. Submit an electronic document, combining the request form with supporting data into single document.

**3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT**

- A. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.
- B. Pursuant to Section 3400 of the Public Contract Code, requests for substitution will be considered only if received up to 7 days prior to the bid date. Subsequent requests will be considered only in the case of product unavailability, through no fault of the Contractor , or for reasons of cost reducing value analysis requested by the District .
- C. Submittal Form (before award of contract):
  - 1. Submit substitution requests by completing the form in Section 00 43 25; see this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.

**3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Submittal Form (after award of contract):
  - 1. Submit substitution requests by completing the form attached to this section. See this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. After Contract award, requests will be considered for cause only; in the case of product unavailability, through no fault of the Contractor , or for reasons of cost reducing value analysis requested by the District.
  - 1. Substitutions will be considered when a product, through no fault of the Contractor, becomes unavailable or unsuitable due to regulatory change.
  - 2. Product Availability Waiver:
    - a. Failure to place orders for specified products sufficiently in advance of required date for incorporation into the Work will not be considered as a valid reason for which Contractor may request a substitution or deviation from requirements of the Drawings and Specifications.
  - 3. Waiver: At the discretion of the District, limitations on substitutions may be waived.
- C. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- D. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.

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1. In addition to meeting general documentation requirements, document how the requested substitution benefits the District through cost savings, time savings, greater energy conservation, or in other specific ways.
  2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
  3. Bear the costs engendered by proposed substitution of:
    - a. District's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
    - b. Other construction by District.
    - c. Other unanticipated project considerations.
- E. Substitutions will not be considered under one or more of the following circumstances:
1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
  2. Without a separate written request.
  3. When acceptance will require revisions to the Contract Documents.

**3.04 CONTRACT DOCUMENT REVISIONS:**

- A. Should a Contractor-proposed substitution or alternative sequence or method of construction require revision of the Contract Drawings or Specifications;
  1. Including revisions for the purposes of determining feasibility, scope or cost, or revisions for the purpose of obtaining review and approval by authorities having jurisdiction.
  2. Revisions will be made by Architect or other consultant of District who is the responsible design professional, as approved in advance by District.
- B. Services of Architect or other consultant of the District, including time spent in researching and reporting on proposed substitutions or alternative sequence and method of construction, shall be paid by Contractor when such activities are considered additional services to the design services contracts of the Architect or other responsible design professional with the District.
- C. Costs of services by Architect or other responsible design professional of the District shall be paid on a time and materials basis, based on current hourly fee schedules, with reproduction, long distance telephone and shipping costs reimbursable at cost plus usual and customary mark-up for handling and billing.
- D. Such fees shall be paid whether or not the proposed substitution or alternative sequence or method of construction is ultimately accepted by District and a Change Order is executed.
- E. Such fees shall be paid from Contractor's portion of savings, if a net reduction in Contract Sum results. If fees exceed Contractor's portion of net reduction, Contractor shall pay all remaining fees unless otherwise agreed in advance by the District.
- F. Such fees owed shall be deducted from the amount owed Contractor on the Application for Payment next made following completion of revised Contract Drawings and Specifications or completion of research and other services. District will then pay Architect or other consultant of the District.
- G. Certain substitutions require approval from DSA.

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**3.05 RESOLUTION**

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
  - 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

**3.06 ACCEPTANCE**

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

**3.07 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

**3.08 ATTACHMENTS**

- A. A facsimile of the Substitution Request Form (During Construction) required to be used on the Project is included after this section.

**END OF SECTION**

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**SECTION 01 30 00  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Construction progress schedule.
- G. Contractor's daily reports.
- H. Progress photographs.
- I. Coordination drawings.
- J. Submittals for review, information, and project closeout.
- K. Number of copies of submittals.
- L. Requests for Interpretation or Information (RFI) procedures.
- M. Submittal procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 32 16 - Construction Progress Schedule: Form, content, and administration of schedules.
- B. Section 01 60 00 - Product Requirements: General product requirements.
- C. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- D. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.
- E. Technical Product Sections: Procedures for specific submittals specified in those Sections to be made at Contract closeout.

**1.03 DEFINITIONS**

- A. Action Submittals: Written and graphic information that requires responsive action by Construction Manager and Architect or other responsible design professional.
- B. Informational Submittals: Written information that does not require responsive action by Construction Manager and Architect or other responsible design professional.
- C. Unsolicited Submittals: Action or informational submittals not required by the Contract Documents or not requested by the reviewer. Unsolicited submittals may be returned with notation "not reviewed."

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- D. Product Data: Standard published information ("catalog cuts") and specially prepared data for the Work of the Contract, including standard illustrations, schedules, brochures, diagrams, performance charts, instructions and other information to illustrate a portion of the Work.
- E. Request for Interpretation or Information (RFI): A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as an RFI.
- F. Samples: Physical examples that demonstrate the materials, finishes, features, workmanship and other characteristics of a portion of the Work. Accepted samples shall serve as quality basis for evaluating the Work.
- G. Shop Drawings, Product Data and Samples: Instruments prepared and submitted by Contractor, for Contractor's benefit, to communicate to Architect the Contractor's understanding of the design intent, for review and comment by Architect on the conformance of the submitted information to the general intent of the design. Shop drawings, product data and samples are not Contract Documents.
- H. Shop Drawings: Drawings, diagrams, schedules and illustrations, with related notes, specially prepared for the Work of the Contract, to illustrate a portion of the Work.
- I. Other Submittals: Technical data, test reports, calculations, surveys, certifications, special warranties and guarantees, operation and maintenance data, extra stock and other submitted information and products shall not be considered as Contract Documents but shall be information from Contractor to Architect to illustrate a portion of the Work for confirmation of understanding of design intent.

**1.04 PROJECT COORDINATOR**

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for material delivery access, traffic, and parking facilities.
  - 1. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 10 00 - Summary.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
  - 1. Requests for Interpretation or Information.
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.

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5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE**

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
  1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation or Information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
  2. Contractor and Architect are required to use this service.
  3. It is Contractor's responsibility to submit documents in allowable format.
  4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
  5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, [www.adobe.com](http://www.adobe.com), or Bluebeam PDF Revu, [www.bluebeam.com](http://www.bluebeam.com)), unless such software capability is provided by the service provider.
  6. Unless specifically requested, paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
  7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.
- C. Submittal Service: The selected service is:
  1. Bluebeam Software Inc.; Bluebeam Revu Studio: [www.bluebeam.com](http://www.bluebeam.com).
  2. Other Service acceptable to both District and Architect.
    - a. Direct email with PDF copies.

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- D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
  - 1. Representatives of District are scheduled and included in this training.
- E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for District.

**3.02 PRECONSTRUCTION MEETING**

- A. District will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. District.
  - 2. Architect.
  - 3. Contractor.
- C. Agenda:
  - 1. Execution of District-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  - 5. Submission of initial Submittal schedule.
  - 6. Designation of personnel representing the parties to Contract and <1|A/E|>.
  - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 8. Scheduling.
  - 9. Scheduling activities of a Geotechnical Engineer.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, District, participants, and those affected by decisions made.

**3.03 SITE MOBILIZATION MEETING**

- A. Schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
  - 1. Contractor.
  - 2. District.
  - 3. Architect.
  - 4. Contractor's superintendent.
  - 5. Major subcontractors.
  - 6. Inspector of Record.
- C. Agenda:
  - 1. Distribute and discuss list of subcontractors and suppliers.

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2. Project Communication Procedures: Review requirements and administrative requirements for written and oral communications.
  - a. Review requirements and administrative procedures Contractor may wish to institute for identification and reporting purposes.
3. Change Procedures: Review requirements and administrative procedures for Change Orders, Construction Change Directives, Architect's supplemental instructions and Contractor's Requests for Interpretation or Information.
4. Use of premises by District and Contractor.
  - a. Site access restrictions, if any, and requirements to avoid disruption of operations at adjoining facilities or operations.
  - b. Construction Facilities and Temporary Utilities: Designate storage and staging areas, construction office areas; review temporary utility provisions; present District's requirements for use of premises.
5. District's requirements.
6. Construction facilities and controls provided by District.
7. Temporary utilities provided by District.
8. Survey and building layout.
9. Security and housekeeping procedures.
10. Schedules.
  - a. Distribute and discuss initial construction schedule and critical work sequencing of major elements of Work;
  - b. Include coordination of District Furnished / Contractor Installed (OFCl) products;
11. Application for payment procedures.
12. Procedures for testing.
13. Procedures for maintaining record documents.
14. Requirements for start-up of equipment.
15. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, District, participants, and those affected by decisions made.

**3.04 PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the work at maximum bi-weekly intervals.
- B. Meeting Time and Location: As mutually agreed by District, Architect, and Contractor, at on-site location.
- C. Special Meetings: As necessary, Construction Manager may convene special meetings to discuss specific construction issues in detail and to plan specific activities.
  1. See Section 01 70 00 - Execution and Closeout Requirements.
- D. Attendance Required:
  1. Contractor.

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2. District.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.

E. Agenda:

1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of RFIs log and status of responses.
7. Review of off-site fabrication and delivery schedules.
8. Maintenance of progress schedule.
9. Corrective measures to regain projected schedules.
  - a. Develop corrective measures and procedures, including but not necessarily limited to additional personnel loading to regain planned schedule.
10. Planned progress during succeeding work period.
11. Coordination of projected progress.
12. Maintenance of quality and work standards.
13. Effect of proposed changes on progress schedule and coordination.
14. Other business relating to work.

- F. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, District, participants, and those affected by decisions made.

**3.05 CONSTRUCTION PROGRESS SCHEDULE**

- A. Contractor's Review: All schedules shall be reviewed and approved by Contractor prior to submission for Architect's and DSA's review.
- B. Reviews by Architect and DSA will be to ascertain the general status of construction and shall not be interpreted to establish or approve the means, methods, techniques and sequences of construction.

**3.06 DAILY CONSTRUCTION REPORTS**

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.
- B. In addition to transmitting electronically a copy to District and Architect, submit two printed copies at weekly intervals.
  1. Submit in format acceptable to District.
  2. Submit using required form, a sample of which is appended to this section.

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- C. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
1. Date.
  2. High and low temperatures, and general weather conditions.
  3. List of subcontractors at Project site.
  4. List of separate contractors at Project site.
  5. Approximate count of personnel at Project site.
    - a. Include a breakdown for supervisors, laborers, journeymen, equipment operators, and helpers.
  6. Major equipment at Project site.
  7. Material deliveries.
  8. Safety, environmental, or industrial relations incidents.
  9. Meetings and significant decisions.
  10. Unusual events (submit a separate special report).
  11. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
  12. Meter readings and similar recordings.
  13. Emergency procedures.
  14. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
  15. Change Orders received and implemented.
  16. Testing and/or inspections performed.
  17. List of verbal instruction given by District and/or Architect.
  18. Signature of Contractor's authorized representative.

**3.07 PROGRESS PHOTOGRAPHS**

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- C. Photography Type: Digital; electronic files.
- D. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- E. In addition to periodic, recurring views, take photographs of each of the following events:
  1. Completion of site clearing.
  2. Excavations in progress.
  3. Foundations in progress and upon completion.
  4. Structural framing in progress and upon completion.

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5. Enclosure of building, upon completion.
  6. Final completion, minimum of ten (10) photos.
- F. Take photographs as evidence of existing project conditions as follows:
1. Interior views: each elevation, floor and ceilings prior to demolition.
  2. Exterior views: each elevation, roof and areas adjacent to construction limits.
- G. Views:
1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
  2. Consult with Architect for instructions on views required.
  3. Provide factual presentation.
  4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
  5. Point of View Sketch: Provide sketch identifying point of view of each photograph.
- H. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
1. Delivery Medium: Via email.
  2. File Naming: Include project identification, date and time of view, and view identification.
  3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
  4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
  5. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

**3.08 COORDINATION DRAWINGS**

- A. See Section 01 31 14 - Facility Services Coordination.
- B. Provide information required by Project Coordinator for preparation of coordination drawings.
- C. Review drawings prior to submission to Architect.

**3.09 REQUESTS FOR INTERPRETATION OR INFORMATION (RFI)**

- A. Definition: A request seeking one of the following:
  1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
  2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

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- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
1. Prepare a separate RFI for each specific item.
    - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
    - b. Do not forward requests which solely require internal coordination between subcontractors.
  2. Prepare in a format and with content acceptable to District.
    - a. Use the form provided in this project manual.
    - b. Use CSI/CSC Form 13.2A - Request for Interpretation.
  3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Include in each request Contractor's signature attesting to good faith effort to determine from the Contract Documents information requiring interpretation.
    - a. Submit RFIs from subcontractors and material suppliers through, be reviewed by and be attached to an RFI prepared, signed and submitted by Contractor.
      - 1) RFIs from subcontractors and material suppliers are to be:
        - (a) Reviewed by Contractor.
        - (b) Corrected and rewritten to clarify as required by Contractor.
        - (c) Placed on the proper form, then signed, and submitted by Contractor.
        - (d) RFIs submitted directly by subcontractors or material suppliers will be returned unanswered to the Contractor.
      - 2) RFIs submitted directly by subcontractors or material suppliers will be returned unanswered to the Contractor.
    - b. Review all subcontractor- and supplier-initiated RFIs and take actions to resolve issues of coordination, sequencing and layout of the Work.
      - 1) RFIs submitted to request clarification of issues related to means, methods, techniques and sequences of construction or for establishing trade jurisdictions and scopes of subcontracts will be returned without response.
        - (a) Such issues are solely the Contractor's responsibility.
      - 2) Contractor is responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.
  2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
    - a. Approval of submittals (use procedures specified elsewhere in this section).
    - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
    - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).

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- d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
- 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
- 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
  - a. The District reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
  - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
  - 2. District's, Architect's, and Contractor's names.
  - 3. Discrete and consecutive RFI number, and descriptive subject/title.
  - 4. Issue date, and requested reply date.
  - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
  - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
    - a. Inability to determine from the Contract Documents the exact material, process, or system to be installed;
    - b. Or when the elements of construction are required to occupy the same space (interference);
    - c. Or when an item of Work is described differently at more than one place in the Contract Documents.
  - 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
    - a. In all cases, furnish all information required for the Architect to analyze and/or understand the circumstances causing the RFI and prepare a clarification or direction as to proceed for RFIs issued to request clarification of issues related to:
      - 1) Means, methods, techniques and sequences of construction, for example
      - 2) Pipe and duct routing, clearances;
      - 3) Specific locations of Work shown diagrammatically;

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- 4) Apparent interferences and similar items.
  - 5) If information included with this type RFI by the Contractor is insufficient, the RFI will be returned unanswered.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
- 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
  - 2. Note dates of when each request is made, and when a response is received.
  - 3. Highlight items requiring priority or expedited response.
  - 4. Highlight items for which a timely response has not been received to date.
  - 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
- 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to District.
- 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
  - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
  - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
  - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

**3.10 SUBMITTAL SCHEDULE**

- A. Submit to Architect for review a schedule for submittals in tabular format.
- 1. Submit at the same time as the preliminary schedule.
    - a. Submit initial Submittals Schedule within 14 days of date of Notice of Award of construction.
    - b. After review and return by Architect, resubmit Submittals Schedule within 10 days and thereafter submit updated Submittals Schedules at each Construction Progress Meeting.
    - c. Submit one copy each to Owner and Architect.

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2. Coordinate with Contractor's construction schedule and schedule of values.
3. Format schedule to allow tracking of status of submittals throughout duration of construction.
  - a. Prepare schedules in Gantt format using software at Contractor's option, providing clear indication of sequencing and scheduling of Work, for determination of "critical path" of construction progress.
    - 1) Submittals shall be connected to the related construction element by a graphically indicated critical path on the same page.
    - 2) Present schedules using opaque reproductions on substantial paper, with sheet size a multiple of 8-1/2 by 11 inches and large enough to clearly read characters.
4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

### 3.11 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
  1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

### 3.12 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
  1. Design data.
  2. Certificates.
  3. Test reports.
  4. Inspection reports.
  5. Manufacturer's instructions.
  6. Manufacturer's field reports.
  7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for District.

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**3.13 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
  - 1. Project record documents.
  - 2. Operation and maintenance data.
    - a. Include operation and maintenance data submittals in Submittals Schedule specified above.
    - b. Provide space for review action stamps and, if required by governing authorities having jurisdiction, license seal of design Professional, if applicable.
  - 3. Warranties.
  - 4. Bonds.
  - 5. Other types as indicated.
- D. Submit for District's benefit during and after project completion.

**3.14 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format with renderable text; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Small Size Sheets, Not Larger Than 11 by 17 inch: Submit one copy; the Contractor shall make his own copies from original returned by the Architect after making his own file copy.
- C. Extra Copies at Project Closeout: See Section 01 78 00.
- D. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
  - 1. After review, produce duplicates.
  - 2. Retained samples will not be returned to Contractor unless specifically so stated.
  - 3. Quantity:
    - a. Submit minimum of four (4) samples of each of color, texture and pattern.
    - b. Submit one item only of actual assembly or product.
    - c. Unless otherwise noted, full-size and complete samples will be returned and may be incorporated into field mock-ups and the Work.

**3.15 SUBMITTAL PROCEDURES**

- A. General Requirements:
  - 1. Use a separate transmittal for each item.
  - 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
  - 3. Transmit using approved form.

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4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
  - a. For example:
    - 1) 09 21 16-1 - First submittal for Section 09 21 16 - Gypsum Board Assemblies.
    - 2) 09 21 16-2 - Second submittal for Section 09 21 16 - Gypsum Board Assemblies.
  - b. Use same number for resubmittals as original submittal, followed by a letter indicating sequential resubmittal. For example:
    - 1) 09 21 16-2A - Resubmission of second submittal for Section 09 21 16 - Gypsum Board Assemblies.
    - 2) 09 21 16-2B - Second resubmission of second submittal for Section 09 21 16 - Gypsum Board Assemblies.
6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
  - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
  - b. Field measurements have been determined and verified.
  - c. Conformance with requirements of Contract Drawings and Specifications is confirmed.
  - d. Catalog numbers and similar data are correct.
  - e. Work being performed by various subcontractors and trades is coordinated.
  - f. Field construction criteria have been verified, including confirmation that information submitted has been coordinated with the work being performed by others for District and actual site conditions.
  - g. All deviations from requirements of Drawings and Specifications have been identified and noted.
7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
  - a. Send submittals in electronic format via email to Architect.
  - b. Upload submittals in electronic form to Electronic Document Submittal Service website.
8. Schedule submittals to expedite the Project, and coordinate submission of related items.
  - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
  - b. For sequential reviews involving Architect's consultants, District, or another affected party, allow an additional 7 days.

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9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
    - a. Changes in the Work shall not be authorized by submittals review actions.
    - b. No review action, implicit or explicit, shall be interpreted to authorized changes in the Work.
    - c. Changes shall only be authorized by separate written Contract Change Order or Construction Change Directive, in accordance with the Conditions of the Contract and Section 01 20 00 - Price and Payment Procedures.
  10. Provide space for Contractor and Architect review stamps.
  11. When revised for resubmission, identify all changes made since previous submission.
  12. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
  13. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
  14. Submittals not requested will be recognized, but will be returned without comment,
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
  2. Collect required information into a single submittal.
  3. Submit concurrently with related shop drawing submittal.
  4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
  2. Use of reproductions of the Contract Documents in digital data form to create shop drawings is only permitted as defined in Division 01 and individual product sections.
  3. Coordination: Show all field dimensions and relationships to adjacent or critical features of Work.
  4. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
  2. Samples will be reviewed for aesthetic, color, or finish selection.
  3. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
  4. Color Selection Samples: Architect will review and select colors for Project only after all colors are received, so that colors may be properly coordinated.
  5. Copies: Submit actual samples. Photographic or printed reproductions will not be accepted.
  6. Review of Field Samples: Review by Architect of field samples will be made for the following example products, as applicable, if not otherwise required and if requested by

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Contractor.

- a. Concrete wall finishes and detailing (edges, corners and reveals).
- b. Concrete paving colors and textures.
- c. Gypsum board textures and finishes.
- d. Field-applied paint colors and finishes.

### 3.16 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
  - 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
  - 1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved", or language with same legal meaning.
    - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
      - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
      - 2) Non-responsive resubmittals may be rejected.
  - 2. Not Authorizing fabrication, delivery, and installation:
    - a. "Revise and Resubmit".
      - 1) Resubmit revised item, with review notations acknowledged and incorporated.
      - 2) Non-responsive resubmittals may be rejected.
    - b. "Rejected".
      - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
  - 1. Items for which no action was taken:
    - a. "Received" - to notify the Contractor that the submittal has been received for record only.
  - 2. Items for which action was taken:

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- a. "Reviewed" - no further action is required from Contractor.

**END OF SECTION**

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**SECTION 01 30 00.01  
REQUEST FOR INTERPRETATION**

**RFI NUMBER:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**PROJECT NAME: SWIMMING POOL REFURBISHMENT PROJECT NO.: 21057.00**

**TO: TBP/ARCHITECTURE**

Construction Manager

Attention: \_\_\_\_\_

Contractor: \_\_\_\_\_

Address: \_\_\_\_\_

**BRIEF SUMMARY OF RFI:** \_\_\_\_\_

Drawing No. \_\_\_\_\_ Detail No. \_\_\_\_\_

Specification Section \_\_\_\_\_ Title \_\_\_\_\_

Page \_\_\_\_\_ Paragraph \_\_\_\_\_

**DETAILS OF THIS RFI:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**SUGGESTED SOLUTION:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Response required by: \_\_\_\_\_ (min. 3 full days) Submitted By: \_\_\_\_\_

Organization: \_\_\_\_\_

**RESPONSE:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attachments: \_\_\_\_\_

Response By: \_\_\_\_\_ Date: \_\_\_\_\_

Organization: \_\_\_\_\_

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Copies: \_\_ File \_\_ District \_\_ Structural \_\_ Mechanical \_\_ Plumbing \_\_ Electrical  
\_\_ Civil \_\_ Landscape \_\_other consultants

**END OF RFI**

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**SECTION 01 31 14  
FACILITY SERVICES COORDINATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Services of a coordinator for facility services construction.
- B. Coordination documents.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Responsibilities of separate contractors.
  - 1. Various types of Work to be coordinated, including Owner-Furnished / Contractor-Installed products.
- B. Section 01 30 00 - Administrative Requirements: Additional requirements for coordination.
- C. Section 01 60 00 - Product Requirements: Spare parts and maintenance materials.
  - 1. Coordination of products, especially general requirements for system completeness and product substitutions.
- D. Section 01 70 00 - Execution and Closeout Requirements: Starting of Systems. Systems Demonstration.
- E. Section 01 78 00 - Closeout Submittals: Project record documents.

**1.03 MECHANICAL AND ELECTRICAL COORDINATOR**

- A. Employ and pay for services of a person, technically qualified and administratively experienced in field coordination of the type of work required to be coordinated, for the duration of the Work.
  - 1. This designated individual may serve a dual role on the project team.

**1.04 SUBMITTALS**

- A. Submit name, address, and telephone number of coordinator and name of principal officer for review.
- B. Submit coordination drawings and schedules prior to submitting shop drawings, product data, and samples.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 COORDINATION REQUIRED**

- A. Coordinate the Work as stated in the Conditions of the Contract.
  - 1. Coordinate Work under the Contract with work under separate contracts by District.

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2. Preinstallation Meetings: Coordinate and document work between trades. See Section 01 70 00 - Execution and Closeout Requirements.
  3. Cooperate with District, Construction Manager, and others as directed by District in scheduling and sequencing the incorporation into the Work of Owner Furnished / Contractor Installed (OFCI) products identified in the Contract Drawings and Specifications.
- B. Relationship of Documents:
1. Drawings, Specifications and other Contract Documents in the Project Manual are intended to be complementary.
  2. What is required by one shall be as if required by all.
  3. What is shown or required, or may be reasonably inferred to be required, or which is usually and customarily provided for similar work, shall be included in the Work.
- C. Discrepancies:
1. Error, omission, ambiguity or conflict in Drawings or Specifications shall be brought to Architect's attention during the bidding period, for Architect's determination and direction in accordance with provisions of the Conditions of the Contract.
- D. Construction Interfacing and Coordination: Layout, scheduling and sequencing of Work shall be solely the Contractor's responsibility.
1. Contractor shall verify, confirm and coordinate field measurements so that new construction correctly and accurately interfaces with conditions existing prior to construction.
- E. Contractor shall bring together the various parts, components, systems and assemblies as required for the correct interfacing and interpretation of all elements of the Work.
1. All work required to provide complete and fully operational systems shall be included in the contract price.
  2. Contractor shall coordinate Work to correctly and accurately connect abutting, adjoining, overlapping and related elements, including work under separate contracts by District, utility agencies and companies.
- F. Coordinate the work listed below:
1. Structural: Division 03, Division 04, Division 05, and Division 06.
  2. Architectural: Division 7, Division 8, Division 9, and Division 12.
  3. Specialties: Division 10.
  4. Fire Suppression: Division 21.
  5. Plumbing: Division 22.
  6. Heating, Ventilating, and Air Conditioning: Division 23.
  7. Electrical: Division 26.
  8. Electronic Safety and Security: Division 28.
- G. Coordinate progress schedules, including dates for submittals and for delivery of products.
- H. Conduct meetings among subcontractors and others concerned, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.

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- I. Participate in progress meetings. Report on progress of work to be adjusted under coordination requirements, and any required changes in schedules. Transmit minutes of meetings and reports to concerned parties.
- J. Coordination of subcontracts and separate contracts
  - 1. Superintendence of Work:
    - a. Contractor shall appoint a field superintendent and a project manager, who shall directly and full time supervise and coordinate all Work of the Contract.
  - 2. Subcontractors, Trades and Materials Suppliers:
    - a. Require all subcontractors, trades, crafts and suppliers to coordinate their portions of Work with the Contractor's field superintendent to prevent scheduling, sequencing, dimensional and other conflicts and omissions.
  - 3. Coordination with Work Under Separate Contracts:
    - a. Coordinate and schedule Work under the Contract with work being performed for Project under separate contracts by District, serving utilities and public agencies.
    - b. Make and facilitate direct contacts with parties responsible for work of the Project under separate contracts, in order to provide timely notifications and to facilitate information exchanges.

**3.02 COORDINATION DOCUMENTS**

- A. Prepare coordination drawings to organize installation of products for efficient use of available space, for proper sequence of installation, and to identify potential conflicts.
  - 1. Structural requirements take precedence when the requirements of the Mechanical, Electrical or other items are in conflict with structural.
  - 2. Take all precautions prior to coring into an existing building structure.
  - 3. Notify the structural engineer and obtain written approval prior to completing any structural penetrations if the structural integrity of an existing or new building structure may be compromised. Refer to Section 01 70 00 - Execution and Closeout Requirements for cutting and patching.
  - 4. Review limitations in available space for installation or service.
    - a. Overlay plans of each trade and verify space requirements and conflicts between trades.
    - b. Minor changes and adjustments that do not affect design intent may be made by Contractor and highlighted for Architect's review prior to purchase and installation.
  - 5. Incompatibility between items provided under different trades.
  - 6. Inconsistencies between drawings, specifications and codes (between trades and within each trade).
  - 7. Items required for existing facilities construction projects are designed and prepared from available as-built drawings that are verified through non-invasive and non-destructive, visual observation only.
    - a. Field verify actual existing conditions during and upon completion of demolition work and incorporate findings into preparation of coordination drawings.

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- b. Minor changes and adjustments that do not affect design intent may be made by Contractor and highlighted for Construction Manager and Architect's review prior to purchase and installation.
- B. Prepare a master schedule identifying responsibilities for activities that directly relate to this work, including submittals and temporary utilities; organize by specification section.
- C. Verify that utility, and other building system requirement characteristics of operating equipment are compatible with provided utilities, and other building systems.
  - 1. Coordinate work of various trades having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Identify electrical power characteristics and control wiring required for each item of equipment.
- E. Maintain documents for the duration of the work, recording changes due to site instructions, modifications or adjustments.
- F. After Architect review of original and revised documents, reproduce and distribute copies to concerned parties.

**3.03 COORDINATION OF SUBMITTALS**

- A. Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination with related work. Transmit copies of reviewed documents to Architect.
- B. Check field dimensions and clearances and relationship to available space and anchors.
- C. Check compatibility with equipment and work of other sections, electrical characteristics, and operational control requirements.
- D. Check motor voltages and control characteristics.
- E. Coordinate controls, interlocks, wiring of switches, and relays.
- F. Coordinate wiring and control diagrams.
- G. When changes in the work are made, review their effect on other work.
- H. Verify information and coordinate maintenance of record documents.

**3.04 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS**

- A. Review proposals and requests for substitution prior to submission to Architect.
- B. Verify compliance with Contract Documents and for compatibility with work of other sections.
- C. Submit with recommendation for action.

**3.05 OBSERVATION OF WORK**

- A. Observe work for compliance with Contract Documents.
- B. Maintain a list of observed deficiencies and defects; promptly submit.

**3.06 DOCUMENTATION**

- A. Observe and maintain a record of tests. Record:
  - 1. Specification section number and product name.
  - 2. Name of Contractor, subcontractor and special inspector.

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3. Name of testing agency and name of inspector.
  4. Name of manufacturer's representative present.
  5. Date, time, and duration of tests.
  6. Type of test, and results.
  7. Retesting required.
- B. Assemble background documentation for dispute and claim settlement.
  - C. Submit copies of documentation to Architect upon request.

**3.07 EQUIPMENT START-UP**

- A. Verify utilities, connections, and controls are complete and equipment is in operable condition as required by Section 01 70 00.
- B. Observe start-up and adjustments, test run, record time and date of start-up, and results.
- C. Observe equipment demonstrations made to District; record times and additional information required for operation and maintenance manuals.

**3.08 INSPECTION AND ACCEPTANCE OF EQUIPMENT**

- A. Prior to inspection, verify that equipment is tested, operational, clean, and ready for operation.
- B. Assist Architect with review. Prepare list of items to be completed and corrected.

**END OF SECTION**

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**SECTION 01 32 16  
CONSTRUCTION PROGRESS SCHEDULE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Responsibilities of individual Multi-Prime Contractors to coordinate with the DSA's Master Project Schedule.
- B. Preliminary schedule.
- C. Construction progress schedule, with network analysis diagrams and reports.
- D. Summary schedule.
- E. Weekly/Short term (Look Ahead) Schedule.

**1.02 RELATED SECTIONS**

- A. Section 01 10 00 - Summary: Work sequence.
- B. Section 01 30 00 - Administrative Requirements: Submittal Schedule.

**1.03 REFERENCE STANDARDS**

- A. AGC (CPSM) - Construction Planning and Scheduling Manual.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM.

**1.04 SUBMITTALS**

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. Submit two copies to DSA and one copy to Architect.
- C. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- D. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- E. Within 10 days after joint review, submit complete schedule.
- F. Submit updated schedule with each Application for Payment.
  - 1. Revise schedule also upon issuance of Change Orders and Construction Change Directives which substantially affect construction sequence or schedule.
- G. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- H. Submit under transmittal letter form specified in Section 01 30 00 - Administrative Requirements.

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**1.05 QUALITY ASSURANCE**

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one year's minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.
  - 1. Designate the Scheduler in writing and within ten (10) workdays after Notice of Intent to Award, as the qualified responsible person for preparation, maintenance, updating, and revision of all schedules for the full term of construction.
  - 2. Scheduler:
    - a. Dedicated to this project and available on-site as needed to meet the strict requirement of this spec. section.
    - b. All scheduling software and hardware located on-site.
    - c. Scheduler will attend all project meetings called for as specified in Section 01 30 00.
  - 3. Qualifications of responsible person:
    - a. Knowledge of critical path method (CPM) scheduling utilizing Primavera P6 latest release software.
  - 4. References:
    - a. Submit written reference of three (3) project Owners who have personal experience with this scheduler on previous projects.
    - b. Identify name, address, telephone number, project name, and cost.
  - 5. Construction Manager reserves the right to disapprove Scheduler when submitted by Contractor based on his/or her sole discretion. Construction Manager reserves the right to remove Scheduler from the project without cause.
- B. Contractor's Administrative Personnel: Three years minimum experience in using and monitoring CPM schedules on comparable projects.
- C. Reviews by Architect and DSA: Reviews by Architect and DSA will be to ascertain the general status of construction and shall not be interpreted to establish or approve the means, methods, techniques and sequences of construction.
- D. Contractor's Review: All schedules shall be reviewed and approved by Contractor prior to submission for Architect's and DSA's review.
- E. Changes and Deviations: Identify all deviations from requirements of Drawings and Specifications.
  - 1. Changes in the Work shall not be authorized by submittals review actions.
  - 2. No review action, implicit or explicit, shall be interpreted to authorized changes in the Work.
  - 3. Changes shall only be authorized by separate written Change Order or Field Change Directive, in accordance with the Conditions of the Contract.

**1.06 SCHEDULE FORMAT**

- A. Format: Prepare schedules in format at Contractor's option, either bar chart, PERT or GANTT format, providing clear indication of sequencing and scheduling of Work, for determination of

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"critical path" of construction progress.

1. Prepare schedules in MS Project or Primavera.
  2. Provide clear indication of sequencing and scheduling of work for determination of "critical path" of construction progress.
  3. Present schedule in both electronic and reproducible paper formats with sheet size large enough to clearly read the characters.
- B. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- C. Diagram Sheet Size: Maximum 22 x 17 inches.
- D. Sheet Size: Multiples of 8-1/2 x 11 inches.
- E. Scale and Spacing: To allow for notations and revisions.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 PRELIMINARY SCHEDULE**

- A. Prepare preliminary schedule in the form of a horizontal bar chart.
- B. Prescheduling Conference:
1. Construction Manager will conduct a conference within fifteen (15) work days after the Notice of Intent to Award to comply with requirements in Section 01 30 00 - Administrative Requirements.
    - a. Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
      - 1) Review software limitations and content and format for reports.
      - 2) Verify availability of qualified personnel needed to develop and update schedule.
      - 3) Discuss constraints, including phasing work stages area separations interim milestones and partial District occupancy.
      - 4) Review delivery dates for District-furnished products.
      - 5) Review schedule for work of District's separate contracts.
      - 6) Review submittal requirements and procedures.
      - 7) Review time required for review of submittals and resubmittals.
      - 8) Review requirements for tests and inspections by independent testing and inspecting agencies.
      - 9) Review District's IT requirements for installation of their Work.
      - 10) Review time required for Project closeout and District startup procedures, including commissioning activities for MEP, Security Electronics Equipment.
      - 11) Review and finalize list of construction activities to be included in schedule.
      - 12) Review procedures for updating schedule.

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- C. At the meeting, the Construction Manager will review scheduling requirements. These include schedule preparation, reporting requirements, labor and equipment loading, updates, revisions, and schedule delay analysis.
  - 1. The Contractor will present schedule methodology, planned sequence of operations, resource loading methodology, and proposed activity coding structure.
- D. Coding structure:
  - 1. Submit proposed coding structure, identifying the code fields and the associated code values it intends to use in the project schedule.
  - 2. A minimum, include code fields for Project Segment or Phase, Area of Work, Type of Work, Submittal/Procurement/Construction and Responsibility/Subcontractor.
    - a. Refer to NETWORK DETAILS AND GRAPHICAL OUTPUT for listing of activity categories to be included in the schedule.

**3.02 CONTENT**

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
  - 1. Identify Work of separate buildings, phases, units or other logically grouped activities to facilitate review of Application for Payment with completed Work.
- D. Provide sub-schedules for each stage of Work identified in Section 01 10 00 - Summary.
- E. Provide sub-schedules to define critical portions of the entire schedule.
- F. Include conferences and meetings in schedule.
- G. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- H. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
  - 1. Format: Prepare Submittals Schedule in a format comparable to Construction Progress Schedule, specified in Article above.
  - 2. Content: List all items specified to be submitted, indicating submittal number (see instructions specified in Section 01 30 00 - Administrative Requirements, submittal type (i.e., product data, shop drawings, sample, quality control report, maintenance and operating data, etcetera), scheduled date submittal is to be made and date review should be complete in order to maintain construction on schedule.
  - 3. The Contractor shall submit to the Architect a schedule of the shop drawings that lists their required submission and approval dates.
    - a. Allow minimum one (1) week for the Architect to review the submittals. Some submittals may require a longer review period. See Section 01 30 00 - Administrative Requirements.
    - b. Allow for the possibility that the consultant team will request revisions and resubmittal following the initial submittal.

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- c. The schedule shall encompass the entire construction period and will be revised by the Contractor and reviewed by the project team at each project meeting.
- 4. Changes and Deviations: Identify all deviations from requirements of Drawings and Specifications.
  - a. Changes in the Work shall not be authorized by submittals review actions.
  - b. No review action, implicit or explicit, shall be interpreted to authorized changes in the Work.
  - c. Changes shall only be authorized by separate written Change Order or Construction Change Directive, in accordance with the Conditions of the Contract and Section 01 20 00 - Price and Payment Procedures.
- 5. Administration: Review of Submittals Schedules by Architect, DSA, and District will be to ascertain the general status of submittals review and shall not be interpreted to establish or approve the means, methods, techniques and sequences of construction.
  - a. Submit one copy each to DSA and Architect.
  - b. Submit initial Submittals Schedule within 14 days of construction start date established in Notice to Proceed.
  - c. After review, resubmit Submittals Schedule within 10 days and thereafter submit updated Submittals Schedules at each Construction Progress Meeting.
- I. Indicate delivery dates for owner-furnished products.
- J. Coordinate content with schedule of values specified in Section 01 20 00 - Price and Payment Procedures.
  - 1. Include Submittals Schedule.
- K. Provide legend for symbols and abbreviations used.

**3.03 BAR CHARTS**

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

**3.04 NETWORK ANALYSIS**

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
  - 1. Preceding and following event numbers.
  - 2. Activity description.
  - 3. Estimated duration of activity, in maximum 15 day intervals.
  - 4. Project Milestones; include "Project Start" and "End Project" Millstones.

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- a. Schedule starts no earlier than the Project Duration (Day 1) will start on the Notice To Proceed (NTP) date.
- 5. Earliest start date.
- 6. Earliest finish date.
- 7. Actual start date.
  - a. "Project Start" Milestone to have no predecessors and "End Project" Milestone has no successors.
  - b. "Project Start": Constrained by a "Mandatory Start" Milestone.
  - c. "End Project": Constrained by a "Mandatory Finish" Milestone.
  - d. No other activities on the schedule may have constraints, unless reviewed and approved by Construction Manager and Architect.
- 8. Actual finish date.
- 9. Latest start date.
- 10. Latest finish date.
- 11. Total and free float; float time shall accrue to District and to District's benefit.
  - a. Contractor does not own the float.
  - b. "Float time" refers to the time between earliest finish date and the latest finish date of each activity shown on the Construction Schedule.
  - c. Any float time indicated in the Construction Schedules required by this Section are to be held jointly by the District and Contractor.
  - d. Any delay (including District caused) encountered is to be subtracted from the available days ahead of progress against the Construction Schedule.
    - 1) District may claim float days equal to the delay until such float days are exhausted.
    - 2) No compensation of any type will be due the Contractor until the delay extends the overall project substantial completion date.
  - e. Weather (Rain) day requirements are as specified in the "Construction Services Agreement."
- 12. Monetary value of activity, keyed to Schedule of Values.
- 13. Percentage of activity completed.
- 14. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
  - 1. By preceding work item or event number from lowest to highest.
  - 2. By amount of float, then in order of early start.

**3.05 CREW SCHEDULES**

- A. Separate and concurrent with the Baseline Schedule, submit a schedule histogram depicting crew loading for Contractor's own labor forces and those of each subcontractor. Submit this

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crew schedule electronically.

- B. Provide the breakdown of a typical crew, by trade, for resource loading quantification.

**3.06 WEATHER DAYS ALLOWANCE- AS ANTICIPATED BY THE CONTRACTOR**

- A. Based on historical weather in the local area, the Baseline Schedule shall include all non-work days on which the Contractor anticipates Work will not be performed due to adverse weather days that are anticipated to occur within the work day calendar and impact critical activities.
- B. The Contractor shall not receive any additional compensation for unavoidable delays due to inclement or unsuitable weather, and no time extension to complete any Contractual Completion Events as defined in General Conditions, will be considered due to inclement or unsuitable weather or conditions resulting there from.

**3.07 REVIEW AND EVALUATION OF SCHEDULE**

- A. Review all schedules reviewed and approved by Contractor prior to submission for review by Architect and District.
- B. Participate in joint review and evaluation of schedule with Construction Manager and Architect at each submittal.
- C. Evaluate project status to determine work behind schedule and work ahead of schedule.
- D. After review, revise as necessary as result of review, and resubmit within 10 days.
- E. Review by Architect and District will be to ascertain the general status of construction and shall not be interpreted to establish or approve the means, methods, techniques and sequences of construction.

**3.08 SUMMARY SCHEDULE**

- A. Provide Summary Schedule, upon request, which consolidates groups of activities associated with Major Items of Work shown on Baseline Schedule.
  - 1. Summary Schedule is intended to give an overall indication of the project schedule without a large amount of detail.
  - 2. This schedule shall include the current status of each of the contract Milestones listed in the Agreement, and any significant activities that are critical to the completion of the Milestone work at the required time.
- B. Include in the Summary Schedule a separate Gantt Chart depicting only the critical path of the project at the time of the update.
- C. Updated and submitted monthly and with each Schedule Update or Schedule Revision.

**3.09 WEEKLY (SHORT TERM LOOK-AHEAD) SCHEDULE**

- A. Submit to Construction Manager, twenty four (24) hours prior to each weekly progress meeting, a short term look ahead schedule showing the activities completed during the previous week and the schedule of activities for the following 4 weeks.
- B. Using the same computer software as the progress schedule, use the Activity ID's, Descriptions, and logic of the current progress schedule when producing a Weekly Schedule in CPM schedule or a bar chart format.

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- 1. In the event that the Weekly Schedule no longer conforms to the current schedule, Contractor may be required to revise either or both schedule(s).
- C. The activity designations used in the Weekly Schedule must be consistent with those used in the Baseline Schedule and the monthly Schedule Updates.
- D. Contractor and Construction Manager must agree on the format of the Weekly Schedule.
- E. Weekly Schedule should indicate locations of work, critical activities, early start and early finish dates, actual start and actual finish dates, progress, and remaining durations for each activity in the three-week schedule.

**3.10 UPDATING SCHEDULE**

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

**3.11 ADJUSTMENT OF CONTRACT TIMES**

- A. Subject to the terms of General Conditions, contract time will be adjusted only for causes specified as generally described below.
  - 1. Non-excusable delay:
    - a. Includes actions or inactions of the Contractor, or events for which the Contractor has assumed contractual responsibility that would independently delay the completion of the Work beyond the current Contract completion date.
      - 1) This also includes actions or inactions of subcontractors, suppliers, or material manufacturers at any tier.
    - b. No time extensions will be granted for non-excusable delays.
  - 2. Excusable delay:
    - a. Events which are unforeseeable, outside the control of, and without the fault or negligence of either the District or the Contractor (or any party for whom either is responsible), which would independently delay the completion of the Work beyond the current Contract completion date.
    - b. The Contractor is entitled to a time extension only.
    - c. No other damages will be approved.
  - 3. Compensable delay:
    - a. Actions or inactions of the District, or events for which the District has assumed contractual responsibility, which would independently delay the completion of the

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Work beyond the current Contract completion date.

- b. The Contractor is entitled to a time extension and delay damages.
- 4. Concurrent delay:
  - a. Any combination of the above three (3) types of delay occurring on the same calendar date, or cases where the combination consists of two (2) or more instances of the same type of delay occurring on the same calendar date.
    - 1) Exception to concurrent delay:
      - (a) When one cause of delay is District-caused or caused by an event which is beyond the control and without the fault or negligence of either the District or the Contractor and the other Contractor-caused, the Contractor is entitled only to a time extension and no delay damages.
- B. If the Contractor believes that the District has impacted its work, such that the project completion date will be delayed, the Contractor must submit proof demonstrating the delay to the critical path.
  - 1. Proof, in the form of a Time Impact Analysis, may entitle the Contractor to an adjustment of Contract Time.
- C. Notify Construction Manager of a potential request for Contract Time adjustment within five (5) days of the start of the impact.
- D. The Contractor shall prepare and submit along with any Change Order Request (COR), response to Request for Proposal/Quote (RFP/RFQ), Differing Site Condition (DSC) notification or Request for Additional Compensation (RAC) a Time Impact Analysis (TIA) which includes both a written narrative and a schedule diagram depicting how the changed work may affect the progress of work and other schedule activities.
  - 1. The schedule diagram shall show how the Contractor proposes to incorporate the changed work in the schedule, and how it impacts the current updated schedule and critical path.
  - 2. The TIA shall not be resource constrained, or leveled using resource limits.
  - 3. Failure to include a TIA with the COR, Proposal, Quote, DSC or RAC shall constitute a waiver of the right to later claim any adjustment in time based upon changed or unforeseen Work.
- E. Time Impact Analysis (TIA):
  - 1. Use the accepted schedule update that is current relative to the time frame of the delay event (change order, third party delay, or other District-caused delay). Represent the delay event in the schedule by:
    - a. Inserting new activities associated with the delay event into the schedule.
    - b. Revising activity logic.
    - c. Revising activity durations.
  - 2. If the project schedule's critical path and milestone date(s) are impacted as a result of adding this delay event to the schedule, a time extension equal to the magnitude of the impact without resource constraints may be warranted.
  - 3. The Time Impact Analysis submittal must include the following information:
    - a. A fragment of the portion of the schedule affected by the delay event.

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- b. A narrative explanation of the delay issue and how it impacted the schedule.
  - c. A digital file containing the schedule file used to perform the Time Impact Analysis.
- F. When a delay to the project as a whole can be avoided by revising preferential sequencing or logic, and the Contractor chooses not to implement the revisions, the Contractor will be entitled to a time extension and no compensation for extended overhead.
- G. Indicate clearly that the Contractor has used, in full, all project float available for the work involved in the request, including any float that may exist between the Contractor's planned completion date and the Contract completion date.
  - 1. Utilize the latest version of the Schedule Update accepted at the time of the alleged delay, and all other relevant information, to determine the adjustment of the Contract Time.
- H. Adjustment of the Contract Times will be granted only when the Contract Float has been fully utilized and only when the revised date of completion of the Work has been pushed beyond the Contract completion date.
  - 1. Adjustment of the Contract Times will be made only for the number of days that the planned completion of the work has been extended.
- I. Actual delays in activities which do not affect the critical path work or which do not move the Contractor's planned completion date beyond the Contract completion date will not be the basis for an adjustment to the Contract Time.
- J. Submit request as specified with Contract Documents.
  - 1. In cases where the Contractor does not submit a request for Contract Time adjustment for a specific change order, delay, or Contractor request within the specified period of time, then it is mutually agreed that the particular change order, delay, or Contractor request has no time impact on the Contract completion date and no time extension is required.
- K. The Construction Manager will, within five (5) working days after receipt of a Contract Time adjustment, request any supporting evidence, review the facts, and advise the Contractor in writing.
  - 1. Include the new Progress Schedule data, if accepted by the District, in the next monthly Schedule Update.
  - 2. When the District has not yet made a final determination as to the adjustment of the Contract Time, and the parties are unable to agree as to the amount of the adjustment to be reflected in the Progress Schedule, reflect that amount of time adjustment in the Progress Schedule as the Construction Manager may accept as appropriate for such interim purpose.
    - a. It is understood and agreed that any such interim acceptance by the Construction Manager shall not be binding.
    - b. Interim acceptance shall be made only for the purpose of continuing to schedule the Work
    - c. Interim acceptance shall remain until such time as a final determination as to any adjustment of the Contract Time acceptable to the Construction Manager has been made.

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- d. Revise the Progress Schedule prepared thereafter in accordance with the final decision.

**3.12 DISTRIBUTION OF SCHEDULE**

- A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Construction Manager, Architect, District, and other concerned parties.
- B. Posting: Post one copy, minimum, of most recent Construction and Submittals Schedules in the Contractor's jobsite office, readily available to DSA and Architect.
- C. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- D. Archive: Preserve a minimum of two copies of all superseded schedules, with a minimum of one copy available at job office for review by DSA or Architect.

**3.13 FINAL SCHEDULE SUBMITTAL**

- A. The final Schedule Update becomes the As-Built Schedule.
  - 1. The As-Built Schedule reflects the exact manner in which the project was constructed by reflecting actual logic, start and completion dates for all activities accomplished on the project.
  - 2. Contractor's Project Manager and Scheduler sign and certify the As-Built Schedule as being an accurate record of the way the project was actually constructed.
- B. Retainage will not be released until final Schedule Update is provided.

**END OF SECTION**

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**SECTION 01 35 53  
SECURITY PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Security measures including formal security program, entry control, personnel identification, and miscellaneous restrictions.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: use of premises and occupancy.
- B. Section 01 50 00 - Temporary Facilities and Controls: Temporary lighting.

**1.03 SECURITY PROGRAM**

- A. Protect Work , existing premises and District's operations from theft, vandalism, and unauthorized entry.
- B. Initiate program in coordination with District's existing security system at project mobilization.
- C. Maintain program throughout construction period until District acceptance precludes the need for Contractor security.

**1.04 ENTRY CONTROL**

- A. Restrict entrance of persons and vehicles into Project site and existing facilities.
- B. Allow entrance only to authorized persons with proper identification.
- C. Maintain log of workers and visitors, make available to District on request.
- D. District will control entrance of persons and vehicles related to District's operations.
- E. Contractor shall control entrance of persons and vehicles related to District's operations.
- F. Coordinate access of District's personnel to site in coordination with District's security forces.

**1.05 PERSONNEL IDENTIFICATION**

- A. Shall be worn by Contractor's superintendent and all sub contractors
- B. Provide identification badge to each person authorized to enter premises.
- C. Badge To Include: Personal photograph, name, assigned number , expiration date and employer.
- D. Maintain a list of accredited persons, submit copy to District on request.
- E. Special badges shall be issued to construction personnel when term of construction exceeds six months.
- F. Require return of badges at expiration of their employment on the Work.

**1.06 RESTRICTIONS**

- A. Do not allow cameras on site or photographs taken except by written approval of District.

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**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 40 00  
QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Contractor Quality assurance submittals.
- B. Quality assurance.
- C. Testing and inspection agencies and services.
- D. Contractor's construction-related professional design services.
- E. Control of installation.
- F. Tolerances.
- G. Manufacturers' field services.
- H. Defect Assessment.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- B. Section 01 41 00 - Regulatory Requirements: Compliance with applicable codes, ordinances and standards.
- C. Section 01 42 19 - Reference Standards.
- D. Section 01 45 33 - Code-Required Special Inspections: Testing laboratory services and inspections required by Division of the State Architect (DSA), during the course of construction.
- E. Section 01 60 00 - Product Requirements: Requirements for material and product quality.
  - 1. Product options, substitutions, transportation and handling requirements, storage and protection requirements, and system completeness requirements.

**1.03 REFERENCE STANDARDS**

- A. IAS AC89 - Accreditation Criteria for Testing Laboratories.

**1.04 DEFINITIONS**

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.

**1.05 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES**

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
  - 1. Temporary sheeting, shoring, or supports.

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2. Temporary scaffolding.
3. Temporary bracing.
4. Temporary falsework for support of spanning or arched structures.
5. Temporary stairs or steps required for construction access only.
6. Temporary hoist(s) and rigging.
7. Investigation of soil conditions to support construction equipment.

**1.06 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for District's information.
  1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
    - a. Full name.
    - b. Professional licensure information.
    - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C. Quality Control Submittals Schedule
  1. Schedule Format: Include quality control submittals on Submittals Schedule specified in accordance with General Conditions
  2. Schedule Content: List all tests, inspections and reports specified to be submitted, indicating submittal number, submittal type (field test, field inspection, fabrication inspection, etcetera), scheduled date of quality control activity and date report should be made.
- D. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for District's information.
  1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
  2. Include required product data and shop drawings.
  3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
  4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- E. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
  1. Include:
    - a. Date issued.
    - b. Project title and number.

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- c. Name of inspector.
  - d. Date and time of sampling or inspection.
  - e. Identification of product and specifications section.
  - f. Location in the Project.
  - g. Type of test/inspection.
  - h. Date of test/inspection.
  - i. Results of test/inspection.
  - j. Compliance with Contract Documents.
  - k. When requested by Architect, provide interpretation of results.
2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for District's information.
- F. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
- 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- G. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the District's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- H. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for District.
- 1. Submit report in duplicate within 30 days of observation to Architect for information.
  - 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

**1.07 QUALITY ASSURANCE**

- A. Testing Agency Qualifications:
- 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
  - 3. Qualification Statement: Provide documentation showing testing laboratory is approved by Division of the State Architect.
  - 4. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

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- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in California.
- C. Contractor's Quality Control (CQC) Plan:
  - 1. Prior to start of work, submit a comprehensive plan describing how contract deliverables will be produced. Tailor CQC plan to specific requirements of the project. Include the following information:
    - a. Management Structure: Identify personnel responsible for quality. Include a chart showing lines of authority.
      - 1) Include qualifications (in resume form), duties, responsibilities of each person assigned to CQC function.
    - b. Management Approach: Define, describe, and include in the plan specific methodologies used in executing the work.
      - 1) Management and control of documents and records relating to quality.
      - 2) Communications.
      - 3) Coordination procedures.
      - 4) Resource management.
      - 5) Process control.
      - 6) Inspection and testing procedures and scheduling.
      - 7) Control of noncomplying work.
      - 8) Tracking deficiencies from identification, through acceptable corrective action, and verification.
      - 9) Control of testing and measuring equipment.
      - 10) Project materials certification.
      - 11) Managerial continuity and flexibility.
    - c. District will not make a separate payment for providing and maintaining a Quality Control Plan. Include associated costs in Bid price.
    - d. Acceptance of the plan is required prior to start of construction activities not including mobilization work. District's acceptance of the plan will be conditional and predicated on continuing satisfactory adherence to the plan. District reserves the right to require Contractor to make changes to the plan and operations, including removal of personnel, as necessary, to obtain specified quality of work results.
- D. Quality-Control Personnel Qualifications. Engage a person with requisite training and experience to implement and manage quality assurance (QA) and quality control (QC) for the project.

**1.08 REFERENCES AND STANDARDS - SEE SECTION 01 42 19**

**1.09 REGULATORY REQUIREMENTS FOR TESTING AND INSPECTION**

- A. Inspections, testing and approvals as required by authorities having jurisdiction. Refer to Section 01 41 00 - Regulatory Requirements and Section 01 45 33 - Code-Required Special Inspections.

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- B. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing Work.
- C. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgement by the manufacturer that such deviations are acceptable and appropriate for the Project.

**1.10 TESTING AND INSPECTION AGENCIES AND SERVICES**

- A. District will employ and pay for services of an independent testing agency approved by DSA to perform other specified testing.
- B. As indicated in individual specification sections, District or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. Contractor Employed Agency:
  - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3740, and DSA.
  - 2. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
  - 3. Laboratory: Authorized to operate in California.
  - 4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
  - 5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 CONTRACTOR'S QUALITY ASSURANCE**

- A. Quality Requirements: Work shall be accomplished in accordance with quality requirements of the Drawings and Specifications, including, by reference, all Codes, laws, rules, regulations and standards. When no quality basis is prescribed, the quality shall be in accordance with the best accepted practices of the construction industry for the locale of the Project, for projects of this type.
- B. Quality Control Personnel: Contractor shall employ and assign knowledgeable and skilled personnel as necessary to perform quality control functions to ensure that the Work is provided as required.

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### 3.02 CONTROL OF INSTALLATION

- A. Quality of Products: Unless otherwise indicated or specified, all products shall be new, free of defects and fit for the intended use.
- B. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- C. Comply with manufacturers' instructions, including each step in sequence.
- D. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- E. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- F. Have work performed by persons qualified to produce required and specified quality.
- G. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- H. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.
- I. Quality of Installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements.
- J. Protection of Existing and Completed Work: Take all measures necessary to preserve and protect existing and completed Work free from damage, deterioration, soiling and staining, until Acceptance by the District.
- K. Verification of Quality: Work shall be subject to verification of quality by District, or Architect in accordance with provisions of the General Conditions of the Contract.
  - 1. Contractor shall cooperate by making Work available for inspection by District, Architect or their designated representatives.
  - 2. Such verification may include mill, plant, shop, or field inspection as required.
  - 3. Provide access to all parts of the Work, including plants where materials or equipment are manufactured or fabricated.
  - 4. Provide all information and assistance as required, including that by and from subcontractors, installers, fabricators, materials suppliers and manufacturers, for verification of quality by District, or Architect.
  - 5. Contract modifications, if any, resulting from such verification activities shall be governed by applicable provisions in the General Conditions.

### 3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

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**3.04 TESTING AND INSPECTION**

- A. See individual specification sections for testing required.
- B. Testing Agency Duties:
  - 1. Test samples of mixes submitted by Contractor.
  - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 3. Perform specified sampling and testing of products in accordance with specified standards.
  - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  - 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
  - 6. Perform additional tests and inspections required by Architect.
  - 7. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Agency may not approve or accept any portion of the Work.
  - 3. Agency may not assume any duties of Contractor.
  - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
  - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  - 3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 6. Arrange with District's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 7. Inspections and Tests by Authorities Having Jurisdiction:
    - a. Contractor shall cause all tests and inspections to be made for Work under this Contract, as required by Building Departments, Department of Public Works, Fire

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- Department, Health Department and similar agencies having jurisdiction.
- b. Excepted as specifically noted, scheduling, conducting and paying for such inspections shall be solely the Contractor's responsibility.
- 8. Inspections and Tests by Serving Utilities:
  - a. Contractor shall cause all tests and inspections required by serving utilities to be made for Work under this Contract.
  - b. Scheduling, conducting and paying for such inspections shall be solely the Contractor's responsibility.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

**3.05 MANUFACTURERS' FIELD SERVICES**

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect 30 days in advance of required observations.
  - 1. Observer subject to approval of Architect.
  - 2. Observer subject to approval of District.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

**3.06 FIELD QUALITY CONTROL SUBMITTALS**

- A. Administration: Make all submittals to the Architect, unless otherwise directed.
- B. Submittal Identification: Identify each submittal by Specification Section number followed by a number indicating sequential submittal for that Section. Coordinate submittal numbers with submittals specified in Section 01 30 00 - Administrative Requirements.
  - 1. Resubmittals shall use same number as original submittal, followed by a letter indicating sequential resubmittal.

03 30 00 - 1	First submittal for Section 03 30 00 - Cast in Place Concrete.
03 30 00 - 2	Second submittal for Section 03 30 00 - Cast in Place Concrete.
03 30 00 - 2A	Resubmittal of second submittal for Section 03 30 00 - Cast in Place Concrete.
03 30 00 - 2B	Second resubmittal of second submittal for Section 03 30 00 - Cast in Place Concrete.

- C. Project Identification: Title each submittal with Project name, submittal date and Architect's Project number.

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- D. Copies: Provide PDF copies electronically transmitted or submit 6 copies, minimum, of reports of quality control reports on dry-process xerographic copies only.
- E. Contractor's Review:
  - 1. Submittals shall be made in accordance with requirements specified herein and in individual Sections.
  - 2. Indicate clearly on each submittal the specified or referenced values for each quality control activity and the values obtained.
  - 3. Note clearly and sign each submittal certifying that reported quality control activity "Conforms" or "Does Not Conform".
- F. Changes and Deviations:
  - 1. Identify all deviations from requirements of Drawings and Specifications.
  - 2. Changes in the Work shall not be authorized by submittals review actions.
  - 3. No review action, implicit or explicit, shall be interpreted to authorized changes in the Work.
  - 4. Changes shall only be authorized by separate written Change Order or Construction Change Directive, in accordance with the General Conditions and 01 20 00 - Price and Payment Procedures.
- G. Record Submittals: When record submittals are specified, submit three copies or sets only. Record submittals will not be reviewed but will be retained for historical and maintenance purposes.
- H. Unsolicited Submittals: Unsolicited submittals will be returned unreviewed.

**3.07 ARCHITECT'S REVIEW**

- A. General:
  - 1. Submitted Report review by Architect and Architect's consultants shall be only for general conformance with the design concept and requirements based on the information presented.
  - 2. Neither Architect nor Architect's consultants shall verify submitted quality control data.
- B. Contract Requirements:
  - 1. Review by Architect and Architect's consultants shall not relieve the Contractor from compliance with requirements of the Drawings and Specifications.
  - 2. Changes shall only be authorized by separate written Change Order or Construction Change Directive, in accordance with the General Conditions and 01 20 00 - Price and Payment Procedures.
- C. Observations by Architect and Architect's Consultants: Periodic and occasional observations of Work in progress will be made by Architect and Architect's consultants as deemed necessary to review progress of Work and general conformance with design intent.

**3.08 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not conforming to specified requirements, at no change in Contract Sum or Contract Time.

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- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.
- C. Architect's Acceptance and Rejection of Work: Architect reserves the right to reject all Work not in conformance to the requirements of the Drawings and Specifications.
- D. Acceptance of Non-Conforming Work: Acceptance of non-conforming Work, without specific written acknowledgement and approval of the District, shall not relieve the Contractor of the obligation to correct such Work.
  - 1. Acceptance of structurally related non-conforming work shall be submitted to DSA for review and approval.
- E. Contract Adjustment for Non-conforming Work:
  - 1. Should Architect or District determine that it is not feasible or in District's interest to require non-conforming Work to be repaired or replaced, an equitable reduction in Contract Sum shall be made by agreement between District and Contractor.
  - 2. If equitable amount cannot be agreed upon, a Construction Change Directive will be issued and the amount in dispute resolved in accordance with applicable provisions of the General Conditions.
- F. Non-Responsibility for Non-Conforming Work: Architect and Architect's consultants disclaim any and all responsibility for Work produced not in conformance with the Drawings and Specifications.

**END OF SECTION**

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**SECTION 01 41 00  
REGULATORY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 AUTHORITY AND PRECEDENCE OF CODES, ORDINANCES AND STANDARDS**

- A. Authority: All codes, ordinances and standards referenced in the Drawings and Specifications shall have the full force and effect as though printed in their entirety in the Specifications.
- B. Precedence:
  - 1. Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements take precedence.
  - 2. Where the Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, the Drawings and Specifications take precedence so long as such increase is legal.
  - 3. Where no requirements are identified in the Drawings or Specifications, comply with all requirements of applicable codes, ordinances and standards of authorities having jurisdiction.
- C. Applicable Codes, Laws and Ordinances: Refer also to Section 01 10 00 - Summary, regarding permits and licenses.
  - 1. Performance of the Work is be governed by all applicable laws, ordinances, rules and regulations of Federal, State and local governmental agencies and jurisdictions having authority over the Project, including accessibility requirements.
  - 2. Performance of the Work shall be accomplished in conformance with all rules and regulations of public utilities, utility districts and other agencies serving the development.
  - 3. Where such laws, ordinances, rules and regulations require more care or greater time to accomplish Work, or require better quality, higher standards or greater size of products, Work shall be accomplished in conformance to such requirements with no change to the Contract Time and Contract Sum, except where changes in laws, ordinances, rules and regulations occur subsequent to the execution date of the Agreement.
- D. Applicable Building Codes: References on the Drawings or in the Specifications to "code" or "building code" not otherwise identified shall mean the codes specified below, together with all additions, amendments, changes, and interpretations adopted by code authorities of the jurisdiction having authority over the Project.
- E. Performance of the Work shall meet or exceed the minimum regulatory requirements applicable to this project are summarized in this section, as adopted by Division of the State Architect:
  - 1. Part 1, Title 24 CCR - 2019 California Administrative Code.
  - 2. Part 2, Title 24 CCR - 2019 California Building Code (CBC); Volumes 1 and 2.
    - a. Based on ICC (IBC) - ICC International Building Code, 2018.

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3. Part 3, Title 24 CCR - 2019 California Electrical Code (CEC, NFPA 70-NEC 2017).
  4. Part 4, Title 24 CCR - 2019 California Mechanical Code (CMC).
    - a. Based on IAPMO (UMC) - Uniform Mechanical Code, 2018.
  5. Part 5, Title 24 CCR - 2019 California Plumbing Code (CPC).
    - a. Based on IAPMO (UPC) - Uniform Plumbing Code, 2018.
  6. Part 6, Title 24 CCR - 2019 California Energy Code.
  7. Part 9, Title 24 CCR - 2019 California Fire Code (CFC).
    - a. Based on ICC (IFC) - International Fire Code; 2018.
  8. Part 10, Title 24 CCR - 2019 California Existing Buildings Code.
    - a. Based on ICC (IEBC) - ICC International Existing Buildings Code, 2018.
  9. Part 11, Title 24 CCR - 2019 California Green Building Standards Code (CalGreen).
  10. Part 12, Title 24 CCR - 2019 California Referenced Standards Code.
- F. Maintain on site during construction, a copy of California Codes and Regulations; Title 24, California Building Code, Parts 1 through 5.

**1.02 SUMMARY OF REFERENCE STANDARDS**

- A. Regulatory requirements applicable to this project are the following:
- B. California Referenced Standards Code: Chapter 12-7-4 Fire Resistive Standards, for fire rated doors.
- C. National Fire Protection Association (NFPA): (Partial List of Applicable Standards)
  1. Reference CBC for applicable NFPA Standards - 2019 CBC (SFM) Chapter 35.
  2. California Electrical Code:
    - a. NFPA 70 - National Electrical Code.
      - 1) Use 2017 as modified in 2019 CBC Ch.35 Referenced Standards.
  3. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.
- D. 28 CFR 35 - Nondiscrimination on the Basis of Disability in State and Local Government Services; Final Rule; Department of Justice.
- E. 28 CFR 36 - Nondiscrimination by Public Accommodations and in Commercial Facilities; Final Rule; Department of Justice.
- F. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.
- G. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- H. 29 CFR 1910 - Occupational Safety and Health Standards.

**1.03 RELATED REQUIREMENTS**

- A. Section 01 40 00 - Quality Requirements.

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**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 42 19  
REFERENCE STANDARDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Requirements relating to referenced standards.

**1.02 QUALITY ASSURANCE**

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue specified in the individual specification sections, except where a specific date is established by applicable code.
- C. Obtain copies of standards when required by Contract Documents.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Date of Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by Contract Documents by mention or inference otherwise in any reference document.

**PART 2 CALIFORNIA DEPARTMENT OF GENERAL SERVICES, DIVISION OF THE STATE ARCHITECT**

**2.01 INTERPRETATION OF REGULATIONS**

- A. Document IR A-5 - Acceptance of Products, Materials, and Evaluations Reports .
- B. Current listings are on the DGS website:  
<http://www.dgs.ca.gov/dsa/Resources/IRManual.aspx>.

**PART 3 UNITED STATES GOVERNMENT AND RELATED AGENCIES DOCUMENTS**

**3.01 CFR -- CODE OF FEDERAL REGULATIONS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. 16 CFR 260.13 - Guides for the Use of Environmental Marketing Claims; Federal Trade Commission; Recycled Content.
- C. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- D. 28 CFR 36 - Nondiscrimination by Public Accommodations and in Commercial Facilities; Final Rule; Department of Justice.
- E. 29 CFR 1910 - Occupational Safety and Health Standards.

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- F. 29 CFR 1910, Subpart D - Walking-Working Surfaces, 1910.21-1910.30.
- G. 29 CFR 1910.23 - Ladders.
- H. 29 CFR 1910.38 - Emergency action plans.
- I. 29 CFR 1910.132-138 - Personal Protective Equipment.
- J. 29 CFR 1910.134 - Respiratory protection.
- K. 29 CFR 1926.62 - Lead.
- L. 29 CFR 1926.1101 - Asbestos.
- M. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.
- N. 39 CFR 111 - U.S. Postal Service Standard 4C.
- O. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- P. 40 CFR 60 - Standards of Performance for New Stationary Sources.
- Q. 40 CFR 273 - Standards For Universal Waste Management.
- R. 40 CFR 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks.
- S. 40 CFR 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions.
- T. 47 CFR 15 - Radio Frequency Devices.
- U. 47 CFR 68 - Connection of Terminal Equipment to the Telephone Network.
- V. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA).
- W. 49 CFR 178 - Specifications for Packaging.
- X. 49 CFR 192.285 - Plastic Pipe: Qualifying Persons to Make Joints.

**3.02 CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION**

- A. CPSC Pub. No. 325 - Public Playground Safety Handbook.

**3.03 EPA -- ENVIRONMENTAL PROTECTION AGENCY**

- A. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit.
- B. EPA 600/4-90/010 - Compendium of Methods for the Determination of Air Pollutants in Indoor Air.
- C. EPA 600-4-790-20 - Methods for Chemical Analysis of Water and Wastes.
- D. EPA 625/1-86/021 - Design Manual: Municipal Wastewater Disinfection.
- E. EPA 625/R-96/010b - Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air.
- F. EPA 712-C-02-190 - Health Effects Test Guidelines OPPTS 870.1100 Acute Oral Toxicity.

**3.04 FDA -- FOOD AND DRUG ADMINISTRATION**

- A. FDA Food Code - Chapter 6 - Physical Facilities.

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**3.05 FEMA -- U.S. FEDERAL EMERGENCY MANAGEMENT AGENCY**

- A. FEMA (MAPS) - FEMA Map Service Center.
- B. FEMA 412 - Installing Seismic Restraints for Mechanical Equipment.
- C. FEMA 413 - Installing Seismic Restraints for Electrical Equipment.
- D. FEMA 414 - Installing Seismic Restraints for Duct and Pipe.
- E. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage.

**3.06 FS -- FEDERAL SPECIFICATIONS AND STANDARDS (GENERAL SERVICES ADMINISTRATION)**

- A. FED-STD-595C - Colors Used in Government Procurement (Fan Deck)..
- B. FS L-F-001641 - Floor Covering Translucent or Transparent Vinyl Surface with Backing; 1971, and Amendment 2, 1982.
- C. FS L-S-125 - Screening, Insect, Nonmetallic.
- D. FS RR-P-1352 - Partitions, Toilet, Complete; Revision C, 1989.
- E. FS RR-T-650 - Treads, Metallic and Nonmetallic, Skid Resistant.
- F. FS RR-W-365 - Wire Fabric (Insect Screening); 1980, Rev. A (Amended 1986).
- G. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, and Vinyl Composition; Revision B, 1974, and Amendment 1, 1979.
- H. FS TT-B-1325 - Beads (Glass Spheres); Retro-Reflective.
- I. FS TT-P-115 - Paint, Traffic (Highway, White and Yellow); Revision F, 1984.
- J. FS TT-P-1952 - Paint, Traffic and Airfield Marking, Waterborne.
- K. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service.
- L. FS W-C-596 - Connector, Electrical, Power, General Specification for.
- M. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification).
- N. STATE STD 01.01 - Certification Standard Forced Entry and Ballistic Resistance of Structural Systems; Physical Security Division, Office of Physical Security Programs, Bureau of Diplomatic Security, United States Department of State.
- O. UFC 4-010-01 - DoD Minimum Antiterrorism Standards for Buildings.
- P. USPS Handbook AS-503 - Standard Design Criteria; United States Postal Service.

**3.07 GSA -- U.S. GENERAL SERVICES ADMINISTRATION**

- A. GSA PBS-P100 - Facilities Standards for the Public Buildings Service; General Services Administration.

**3.08 NIJ -- NATIONAL INSTITUTE OF JUSTICE (DEPT. OF JUSTICE)**

- A. NIJ 0108.01 - Standard for Ballistic Resistant Protective Materials.

**3.09 PS -- PRODUCT STANDARDS**

- A. PS 1 - Structural Plywood.
- B. PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
- C. PS 20 - American Softwood Lumber Standard.

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**3.10 USDA -- UNITED STATES DEPARTMENT OF AGRICULTURE**

- A. USDA TR-55 - Urban Hydrology for Small Watersheds; USDA Natural Resources Conservation Service.

**3.11 USGS -- UNITED STATES GEOLOGICAL SURVEY**

- A. USGS (FMWQ) - National Field Manual for the Collection of Water-Quality Data; United States Geological Survey.

**END OF SECTION**

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**SECTION 01 45 33  
CODE-REQUIRED SPECIAL INSPECTIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Division of the State Architect (DSA) Procedures for construction oversight and inspections required during the course of construction.
- B. Code-required special inspections.
  - 1. Division of the State Architect (DSA) approved testing laboratory services and inspections required during the course of construction.
- C. Testing services incidental to special inspections.
- D. Submittals.
- E. Manufacturers' field services.
- F. Fabricators' field services.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- B. Section 01 40 00 - Quality Requirements.
- C. Section 01 42 19 - Reference Standards.
- D. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

**1.03 DEFINITIONS**

- A. Code or Building Code: California Building Code and, more specifically, Chapter 17A - Structural Tests and Special Inspections, of same.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located. AHJ for this Project is Division of the State Architect.
- C. Special Inspection:
  - 1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the CBC that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
  - 2. Special inspections are separate from and independent of tests and inspections conducted by District or Contractor for the purposes of quality assurance and contract administration.

**1.04 REFERENCE STANDARDS**

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- B. AISC 341 - Seismic Provisions for Structural Steel Buildings.
- C. AISC 360 - Specification for Structural Steel Buildings.

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- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- F. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
- G. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- H. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- I. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
- J. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- K. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
- L. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- M. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
- N. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing.
- O. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems.
- P. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
- Q. ASTM E2570/E2570M - Standard Test Methods for Evaluating Water-Resistive Barrier (WRB) Coatings Used under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage.
- R. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- S. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel.
- T. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements.
- U. SDI (QA/QC) - Standard for Quality Control and Quality Assurance for Installation of Steel Deck.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency is required to:
  - 1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
  - 3. Submit certification that Special Inspection Agency is acceptable to AHJ.
- C. Testing Agency Qualifications: Prior to the start of work, the Testing Agency is required to:

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1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
2. Submit certification that Testing Agency is acceptable to AHJ.
3. Testing and inspections will be performed by an independent testing laboratory selected and employed by the District and approved by the Division of the State Architect (DSA).
  - a. Qualification of a testing agency or laboratory will be under the jurisdiction of the DSA Structural Safety Section (SSS). Procedural and acceptance criteria are set forth in the California Administrative Code (CBC) Chapter 4.
- D. Manufacturer's Qualification Statement: Manufacturer is required to submit documentation of manufacturing capability and quality control procedures. Include documentation of AHJ approval.
- E. Fabricator's Qualification Statement: Fabricator is required to submit documentation of fabrication facilities and methods as well as quality control procedures.
- F. Distribution List: The Testing Laboratory will make the following distribution of test and inspection reports:
  - 1 District
  - 2 Architect
    - 1 Structural Engineer
    - 1 Contractor
    - 1 District's Inspector
    - 1 Division of the State Architect
- G. Each and every test or inspection report shall bear the File Number and Application Number assigned to this project by the DSA.
- H. DSA Form 291: From the engineering manager of the laboratory of record.
- I. Special Inspection Reports: After each special inspection, Special Inspector is required to promptly submit at least two copies of report; one to Architect and one each to the distribution list.
  1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of Special Inspector.
    - d. Date and time of special inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of special inspection.
    - h. Date of special inspection.
    - i. Results of special inspection.
    - j. Compliance with Contract Documents.

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2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.
  3. Comply with DSA IR 17-12, revised 04/23/20.
- J. Fabricator Special Inspection Reports: After each special inspection of fabricated items at the Fabricator's facility, Special Inspector is required to promptly submit at least two copies of report; one to Architect and one each to the distribution list.
1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of Special Inspector.
    - d. Date and time of special inspection.
    - e. Identification of fabricated item and specification section.
    - f. Location in the Project.
    - g. Results of special inspection.
    - h. Verification of fabrication and quality control procedures.
    - i. Compliance with Contract Documents.
    - j. Compliance with referenced standard(s).
- K. Test Reports: After each test or inspection, promptly submit at least two copies of report; one to Architect and one each to the distribution list.
1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test or inspection.
    - h. Date of test or inspection.
    - i. Results of test or inspection.
    - j. Compliance with Contract Documents.
    - k. Test reports shall be signed by a Civil Engineer licensed in the State of California.
  2. Test reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory.
    - a. Samples taken but not tested shall also be reported.
    - b. Records of special sampling operations as required shall also be reported.
    - c. Reports shall show that the material or materials were sampled and tested in accordance with the requirements of the CBC, and with the approved specifications.

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- d. They shall also state definitely whether or not the material or materials tested comply with requirements.
  - e. Test reports shall be issued within 14 days of finding being known, to all parties listed above.
3. At the completion of the project, Testing Laboratory shall certify in writing and on all required DSA forms, that all work specified or required to be tested and inspected conforms to drawings, specifications and applicable building codes.
4. Verification of Test Reports:
- a. The Testing Laboratory of record shall submit to the Division of the State Architect (DSA) a verified report covering all tests which are required to be made by that agency during the progress of the project.
    - 1) Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time, and at the completion of the project.
    - 2) Specific testing requirements as listed on the Structural Test and Inspections (T&I) Form DSA-103 for this project. These tests may include the following forms:
      - (a) DSA-201: Soils Compaction.
      - (b) DSA-202: Sieve Analysis.
      - (c) DSA-203: Tension/Bend.
      - (d) DSA-204: Compression.
      - (e) DSA-205: Concrete Masonry Unit.
      - (f) DSA-206: Anchor Load.
      - (g) DSA-207: Masonry Core Shear/Compression.
      - (h) DSA-208: High-Strength Bolt.
      - (i) DSA-210: Ultrasonic (NDT).
      - (j) DSA-250: Special Inspection(s).
      - (k) DSA-291: Laboratory Verified Report.
      - (l) DSA-292: Special Inspection(s) Verified Report(s).
      - (m) DSA-293: Geotechnical Verified Report.
      - (n) DSA-403: Energy Compliance Checklist.
    - 3) Other Division of the State Architect (DSA) Certification Documents (Reports) as may be required.
  - b. DSA Form 292 - Special Inspection Verified Report shall be from all special inspectors contracting directly and individually with the school board.
- L. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to Architect and AHJ, in quantities specified for Product Data.
- 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect and AHJ.
- M. Manufacturer's Field Reports: Submit reports to Architect.

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1. Submit report in duplicate within 7 days of observation to Architect for information.
  2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in Contract Documents.
- N. Fabricator's Field Reports: Submit reports to Architect and AHJ.
1. Submit report in duplicate within 30 days of observation to Architect for information.
  2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in Contract Documents.

**1.06 SPECIAL INSPECTION AGENCY**

- A. District will employ services of a Special Inspection Agency to perform inspections and associated testing and sampling in accordance with ASTM E329 and required by the building code.
- B. The Special Inspection Agency may employ and pay for services of an independent testing agency to perform testing and sampling associated with special inspections and required by the building code.
- C. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

**1.07 TESTING AND INSPECTION AGENCIES**

- A. District is to employ services of an independent inspection and testing agency to perform observation, testing and sampling associated with special inspections including those not required by the building code. CAC
  1. Project Inspector and testing lab are employed by the District and approved by:
    - a. A/E of Record.
    - b. Structural Engineer (when applicable).
    - c. DSA.
- B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

**1.08 QUALITY ASSURANCE**

- A. Special Inspection Agency Qualifications:
  1. Independent firm specializing in performing testing and inspections of the type specified in this section.
- B. Testing Agency Qualifications:
  1. Independent firm specializing in performing testing and inspections of the type specified in this section.
  2. Testing Agency must possess DSA LEA Program acceptance.
- C. Testing and inspection services which are performed shall be in accordance with requirements of the CBC, and as specified herein. Testing and inspection services shall verify that work meets the requirements of the Construction Documents.
- D. In general, tests and inspections for structural materials shall include all items enumerated on the Structural Tests and Inspections list for this project as prepared and distributed by the

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Architect.

- E. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document.

**1.09 INSPECTION BY THE DISTRICT**

- A. The District shall have the right to reject materials and workmanship which are defective, or to require their correction.
  - 1. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the District.
  - 2. If the Contractor does not correct such rejected work within a reasonable time, the District may correct such rejected work and charge the expense to the Contractor.
- B. Should it be considered necessary or advisable by the District at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out the completed work; the Contractor shall on request promptly furnish necessary facilities, labor and materials.
  - 1. If such work is found to be defective in any respect due to fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. .
  - 2. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor.

**1.10 DISTRICT'S INSPECTOR**

- A. A Project Inspector (IOR) employed by the District and approved by Architect, Structural Engineer and DSA in accordance with the requirements of the California Building Code will be assigned to the work.
  - 1. Project Inspector duties are specifically defined in CCR Title 24 Part 1, Sec. 4-211(b), 4-219, 4-333(b), 4-336 and 4-342.
- B. The District's Inspector shall at all times have access for the purpose of inspection to all parts of the work and to the shops where the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.
- C. The work of construction in all stages of progress shall be subject to the personal continuous observation of the District's Inspector.
  - 1. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials.
  - 2. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract.
  - 3. Inspector of Record is required to work a normal 40 hour week on this project only. Any overtime required will be at the expense of the Contractor and sub-contractor requiring the inspection.

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**1.11 PAYMENTS**

- A. Costs of initial testing and inspection, except as specifically modified herein, or specified otherwise in technical sections, will be paid for by the District, providing such testing and inspection indicates compliance with Contract Documents. Initial tests and inspections are defined as the first tests and inspections as herein specified.
- B. In the event a test or inspection indicates failure of a material or procedure to meet requirements of Contract Documents, costs for retesting and reinspection will be paid by the District and backcharged to the Contractor.
- C. Additional tests and inspections not herein specified but requested by District or Architect, will be paid for by District, unless results of such tests and inspections are found to be not in compliance with Contract Documents, in which case the District will pay all costs for initial testing as well as retesting and reinspection and backcharge the Contractor.
- D. Costs for additional tests or inspections required because of change in materials being provided or change of source or supply will be paid by District and backcharged to the Contractor.
- E. Costs for tests or inspections which are required to correct deficiencies will be paid by the District and backcharged to the Contractor.
- F. Cost of testing which is required solely for the convenience of Contractor in his scheduling and performance of work will be paid by the District and backcharged to the Contractor.
- G. Overtime costs for testing and inspections performed outside the regular work day hours, including weekends and holidays, will be paid for by the District and backcharged to the Contractor. Such costs include overtime costs for the District's Inspector.
- H. Testing Laboratory shall separate and identify on the invoices, the costs covering all testing and inspections which are to be backcharged to the Contractor as specified above.
- I. Testing Laboratory shall furnish to District a cost estimate breakdown covering initial tests and inspections required by Contract Documents. Estimate shall include number of tests, man-hours required for tests, field and plant inspections, travel time, and costs.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL**

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
  - 1. Continuous Special Inspection: Special Inspection Agency is required to be present in the area where the work is being performed and observe the work at all times the work is in progress.
  - 2. Periodic Special Inspection: Special Inspection Agency is required to be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.
- B. Tests and inspections for the following will be required in accordance with the current CBC, unless otherwise specified.

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**3.02 SPECIAL INSPECTIONS FOR STEEL CONSTRUCTION (CHAPTER 17A AND 22A)**

- A. Structural Steel: Comply with quality assurance inspection requirements of CBC.
- B. Cold-Formed Steel Deck: Comply with quality assurance inspection requirements of SDI (QA/QC).
- C. Erection Inspection: Testing Laboratory will visually inspect bolted and field welded connections, perform such additional tests and inspections of field work as are required by the Architect and prepare test reports for the Architect's review.
- D. Inspect High Strength Bolt Installation per CBC 1705A.2.1, Table 1705A.2.1.
  - 1. Special inspection for high tension bolting will be provided by the Testing Laboratory. Inspection shall be in accordance with RCSC Specification for Structural Joints Using High Strength Bolts, 2014.
  - 2. Comply with DSA Interpretations:
    - a. IR 17-8: Sampling and Testing of High Strength Bolts, Nuts, and Washers 2019 CBC; Revised 09/24/19.
    - b. IR 17-9: High-Strength Structural Bolting Inspection: 2019 CBC; Revised 09/24/19.
- E. Welding:
  - 1. Testing Laboratory will review welding procedure specifications as prepared by the fabricator.
  - 2. Structural Steel:
    - a. Inspect welding per CBC 1705A.2.5.
      - 1) Comply with DSA IR 17-3: Structural Welding Inspection: 2019 CBC; Revised 09/24/19.
    - b. Complete and Partial Joint Penetration Groove Welds: Verify compliance with AWS D1.1/D1.1M and AWS D1.8/D1.8M; continuous.
    - c. Multipass Fillet Welds: Verify compliance with AWS D1.1/D1.1M and BHMA A156.31; continuous.
    - d. Single Pass Fillet Welds Less than 5/16 inch Wide: Verify compliance with AWS D1.1/D1.1M and BHMA A156.31; periodic.
    - e. Plug and Slot Welds: Verify compliance with AWS D1.1/D1.1M and BHMA A156.31; continuous.
    - f. Single Pass Fillet Welds 5/16 inch or Greater: Verify compliance with AWS D1.1/D1.1M and BHMA A156.31; continuous.
    - g. Floor and Roof Deck Welds: Verify compliance with AWS D1.3/D1.3M; continuous.
  - 3. Reinforcing Steel: Verify items listed below comply with AWS D1.4/D1.4M and ACI 318, Section 26.6.
    - a. Provide continuous inspection of welding of reinforcing steel per CBC 1705A.3.1; Table 1705A.3, Item 2; 1903A.8.
  - 4. Ultrasonic Testing: All full penetration multi-pass groove welds shall be subject to ultrasonic testing.
    - a. Defective welds shall be repaired and retested with ultrasonic equipment.

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- b. Initially, all multi-pass groove field welds shall be tested at the rate of 100 percent of each individual welder.
    - 1) If rejectable defects occur in less than 5 percent of the welds tested, the frequency of testing may be reduced to 25 percent.
    - 2) If the rate of rejectable defects increases to 5 percent or more, 100 percent testing shall be reestablished until the rate is reduced to less than 5 percent.
    - 3) The percentage of rejects shall be calculated for each welder independently.
  - c. When ultrasonic indications arising from the weld root can be interpreted as either a weld defect or the backing strip itself, the backing strip shall be removed at the expense of the Contractor, and if no root defect is visible, the weld shall be retested.
    - 1) If no defect is indicated on this retest, and no significant amount of the base and weld metal have been removed, no further repair or welding is necessary.
    - 2) If a defect is indicated, it shall be repaired at the Contractor's expense.
  - 5. Technician to calibrate ultrasonic instrumentation to evaluate the quality of the welds in accordance with AWS D1.1/D1.1M latest Edition.
  - 6. Should defects appear in welds tested, repairs shall be similarly inspected at the Contractor's expense and at the direction of the Architect until satisfactory performance is assured.
  - 7. Other methods of inspection, for example, X-ray, gamma ray, magnetic particle, or dye penetrant, may be used on welds if felt necessary by the Architect.
- F. Corrections:
- 1. Correct deficiencies in structural steel work which inspections and test reports indicate to be not in compliance with the specified requirements.
  - 2. Perform additional tests required to reconfirm noncompliance of the original work and to show compliance of corrected work. Costs for all additional tests will be paid for by the District and backcharged to the Contractor.

**3.03 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION (CHAPTER 17A AND 19A)**

- A. Inspection:
  - 1. Job Site Inspection: CBC 1705A.3, 1705A.3.5 (Conc. Preplacement), 1705A.3.6 (Placing Record), and 1910A.
  - 2. Batch Plant or Weighmaster Inspection: CBC 1705A.3.3.
- B. Reinforcing Steel, Including: Verify compliance with approved contract documents and ACI 318, Sections 20.2, 25.2 through 25.7, and 26.6.
  - 1. Reinforcing Bars: CBC 1901A.6; 1910A.2.
    - a. District's Inspector will inspect all reinforcement for concrete work for size, dimensions, locations and proper placement.
- C. Reinforcing Bar Welding: Verify compliance with AWS D1.4/D1.4M and ACI 318, 26.6.4; continuous.
  - 1. Verify weldability of reinforcing bars other than those complying with ASTM A706/A706M; periodic.

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2. Inspect single-pass fillet welds, maximum 5/16 inch; periodic.
  3. Inspect all other welds; continuous.
  4. Reinforcing Bar Welding Inspection: CBC 1705A.3.1; Table 1705A.3, Item 2; 1903A.8.
- D. Anchors Cast in Concrete: Verify compliance with ACI 318, 17.8.2; periodic.
- E. Bolts Installed in Concrete: Where allowable loads have been increased or where strength design is used, verify compliance with approved Contract Documents and ICC-ES AC308 approved report prior to and during placement of concrete; continuous.
1. Comply with CBC Section 1910A.5; Table 1705A.3, items 4a & 4b, ASCE 7, Section 13.4.
- F. Anchors Post-Installed in Hardened Concrete: Verify compliance with ACI 318.
1. Comply with CBC Section 1910A.5; Table 1705A.3, items 4a & 4b, ASCE 7, Section 13.4.
  2. Adhesive Anchors: Verify horizontally or upwardly-inclined orientation installations resisting sustained tension loads - Section 17.8.2.4; continuous.
  3. Other Mechanical and Adhesive Anchors: Verify as per Chapter 17.8.2; periodic.
- G. Anchors Installed in Hardened Concrete: Verify compliance with ACI 318; periodic.
- H. Design Mix: Verify plastic concrete complies with the design mix in approved contract documents and with CBC Chapter 19A, ACI 318, Sections 26.4.3, 26.4.4; periodic.
1. Portland Cement Tests: CBC 1705A.3.2, 1910A.1.
  2. Concrete Aggregates: CBC 1705A.3.2, 1903A.5.
  3. Batch Plant Inspection: CBC 1705A.3.3.
  4. Waiver of Continuous Batch Plant Inspection and Tests: CBC 1705A.3.3.1.
  5. Admixtures: CBC 1910A.1.
  6. Proportions of Concrete: CBC 1904A (Durability) and 1905A (Modifications to ACI 318).
- I. Concrete Sampling Concurrent with Strength Test Sampling: Each time fresh concrete is sampled for strength tests, verify compliance with ASTM C172/C172M, ASTM C31/C31M and ACI 318, Chapter 26.5, 26.12, and record the following, continuous:
1. Slump.
  2. Air content.
  3. Temperature of concrete.
- J. Concrete Placement: Verify application techniques comply with approved Contract Documents and ACI 318, Chapter 26.5; continuous.
- K. Specified Curing Temperature and Techniques: Verify compliance with ACI 318, Chapter 26.5.3-26.5.5; continuous.
- L. Concrete Strength in Situ: Verify concrete strength complies with approved Contract Documents, CBC Table 1705A.3, 1905A.1.15, and modified ACI 318, Chapter 26.12.2,1(a).
- M. Formwork Shape, Location and Dimensions: Verify compliance with approved Contract Documents and ACI 318, Chapter 26.11.1.2(b); continuous.
- N. Welding of Reinforcing Bars: Conduct special inspections and verify Special Inspector's qualifications in accordance with requirements of AWS D1.4/D1.4M.
- O. District Inspector (IOR) will do the following:

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1. Inspect placing of reinforcing steel and concrete at Project.
2. Obtain weighmaster's certificate and identify mix before accepting each load.
3. Keep daily record of concrete placement, identifying each truck load, time of receipt, and location of concrete in structure.
4. Keep record until completion of Project and make available for inspection by DSA Field Engineer or representative.
5. See also subparagraph on Waiver of Continuous Batch Plant Inspection above.
6. During progress of work, take an additional number of test cylinders as directed by Architect. Conform to CBC 1905A.1.15 (modified ACI 318). Test cylinders need not be made for concrete used in exterior flatwork.
  - a. ACI 318 Section 26.12.2.1 shall be replaced and the Contractor shall comply with the following:
    - 1) Samples for strength test of each class of concrete placed each day shall not be taken less than once for each 50 cubic yards (38.3m<sup>3</sup>) of concrete, or not less than once for each 2,000 square feet (186 m<sup>2</sup>) of surface area of for slabs or walls.
    - 2) Additional samples for seven day compressive strength tests shall be taken for each class of concrete at the beginning of the concrete work or whenever the mix or aggregate is changed.
7. One set of cylinders shall consist of 4 samples all taken from same batch, one to be tested at age of 7 days and two at 28 days.
8. Make and store cylinders according to ASTM C31/C31M.
9. Deliver cylinders to laboratory or store cylinders in a suitable protected environment for pick up by laboratory personnel.
10. Make slump test of wet concrete according to test for slump of portland cement concrete, ASTM C143/C143M, at least at the same frequency that the cylinders are taken.

**3.04 SPECIAL INSPECTIONS FOR SITE-BUILT WOOD CONSTRUCTION**

- A. Conform to CBC 1705A.5.3 Wood Structural Elements and Assemblies.
- B. Conform to CBC 1705A.5.4 for Structural Glue Laminated Timber.

**3.05 SPECIAL INSPECTIONS FOR SOILS**

- A. Materials and Placement: Verify each item below complies with approved construction documents and approved geotechnical report.
  1. Design bearing capacity of material below shallow foundations; periodic.
  2. Design depth of excavations and suitability of material at bottom of excavations; periodic.
  3. Materials, densities, lift thicknesses; placement and compaction of backfill: continuous.
  4. Subgrade, prior to placement of compacted fill verify proper preparation; periodic.
- B. Testing: Classify and test excavated material; periodic.

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- C. Excavations, Foundations and Retaining Walls (Chapters 17A, 18A, and 33):
  - 1. Earth Compaction: CBC 1705A.6; Table 1705A.6, continuous; 1804A.6.
  - 2. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of compacted fill: CBC 1705A.6.1; Table 1705A.6, periodic; 1804A.6.
- D. The Geotechnical Engineer of record or a Geotechnical Engineer selected by the District will provide continuous inspection of fill and will field test fill and earth backfill as placed and compacted, and inspect excavations and subgrade before concrete is placed and provide periodic inspection of open excavations, embankments, and other cuts or vertical surfaces of earth.
  - 1. The Geotechnical Engineer will submit a Verified Report indicating observations, tested fills, and opinion the fills were placed in accordance with the project specifications.
- E. Contractor shall remove unsatisfactory material, re-roll, adjust moisture, place new material, or in the case of excavations, provide proper protective measures, perform other operations necessary, as directed by the Geotechnical Engineer whose decisions and directions will be considered final.
- F. Soils Test and Inspection Procedure:
  - 1. Allow sufficient time for testing, and evaluation of results before material is needed. The Geotechnical Engineer shall be sole and final judge of suitability of all materials.
  - 2. Laboratory compaction tests to be used will be in accordance with ASTM D1557.
  - 3. Field density tests will be made in accordance with ASTM D1556/D1556M.
  - 4. Number of tests will be determined by Geotechnical Engineer. Materials in question may not be used pending test results.
  - 5. Excavation and embankment inspection procedure. Geotechnical Engineer will visually or otherwise examine such areas for bearing values, cleanliness and suitability.
  - 6. Earthwork Test Reports: In order to avoid misinterpretations by the reviewing agencies, all retest results shall be reported on the same sheet, immediately following the previous failure test to which it is related. Retests shall be clearly noted as such.

**3.06 SPECIAL INSPECTIONS FOR FIRE RESISTANT PENETRATIONS AND JOINTS**

- A. Verify penetration firestops in accordance with ASTM E2174.
- B. Verify fire resistant joints in accordance with ASTM E2393.
- C. Inspection: Comply with CBC 1705A.17.

**3.07 SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE**

- A. Seismic Force-Resisting Systems: Comply with the quality assurance plan requirements of AISC 341.
- B. Inspection: Comply with CBC 1705A.12.
- C. Testing: Comply with CBC 1705A.13.
- D. Structural Steel: Comply with the quality assurance plan requirements of AISC 341.
- E. Structural Wood:
  - 1. Field gluing; continuous.

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2. Nailing, bolting, anchoring and other fastening of components within the seismic force-resisting system; periodic.
- F. Cold Formed Steel Light Frame Construction:
1. Field welding; periodic.
  2. Screw attachment, bolting, anchoring and other fastening of components within the main seismic force-resisting system; periodic.
- G. Architectural Components: Erection and fastening of components below; periodic.
1. Exterior cladding; per ICC ESR Report when applicable.
  2. Interior and exterior veneer.
  3. Interior and exterior non-loadbearing walls and partitions.
  4. Suspended ceiling systems and their anchorage, per ICC ESR Report. CBC Section 1705A.12.5 and 1705A.13.2.
- H. Mechanical and Electrical Components:
1. Anchorage of electric equipment required for emergency or standby power systems; periodic.
  2. Installation and anchorage of other electrical equipment; periodic.
  3. Vibration isolation systems where the approved Contract Documents require a nominal clearance of 1/4 inch or less between support frame and seismic restraint; periodic.
  4. Installation of mechanical and electrical equipment, including duct work, piping systems and their structural supports, where automatic fire sprinkler systems are installed.
    - a. Verify clearances have been provide as required by Section 13.2.3 of ASCE 7.
    - b. Verify nominal clearance of 3 inches has been provided between fire protection sprinkler drops and sprigs and: structural members not used collectively or independently to support the sprinklers; equipment attached to the building structure; and other systems' piping.
- I. Designated Seismic System Verification: Verify label, anchorage or mounting complies with certificate of compliance provided by manufacturer or fabricator.
- J. Structural Testing for Seismic Resistance:
1. Concrete reinforcement: Comply with ACI 318, Section 20.2.2.5 and 21.1.52.
    - a. Materials Obtain mill certificates demonstrating compliance with ASTM A615/A615M; periodic.
    - b. Welding: Perform chemical tests complying with ACI 318, Section 26.6.4 to determine weldability; periodic.
  2. Structural Steel: Comply with the quality assurance requirements of AISC 341.
  3. Non-Structural Components:
    - a. General Design Requirements: Obtain manufacturer certification of compliance with requirements of ASCE 7, Section 13.2.1; periodic.
    - b. Designated Seismic Force-Resisting Non-Structural System Components: Obtain manufacturer certification of compliance with ASCE 7, Section 13.2.2; periodic.

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- K. Structural Observations for Seismic Resistance: Visually observe structural system for general compliance with the approved Contract Documents; periodic.

**3.08 SPECIAL INSPECTIONS FOR WIND RESISTANCE**

- A. Structural Wood:
  - 1. Field gluing of components in the main wind force-resisting system; continuous.
  - 2. Nailing, bolting, anchoring and other fastening of components within the main wind force-resisting system; periodic.
- B. Cold-Formed Steel Light Frame Construction:
  - 1. Field welding; periodic.
  - 2. Screw attachment, bolting, anchoring and other fastening of components within the main wind force-resisting system; periodic
- C. Wind Resisting Components:
  - 1. Roof covering, roof deck, and floor framing connections; periodic.
  - 2. Exterior wall covering and wall connections to roof and floor diaphragms and framing; periodic.
- D. Structural Observations for Wind Resistance: Visually observe structural system for general compliance with the approved Contract Documents; periodic.

**3.09 STRUCTURAL OBSERVATIONS FOR STRUCTURES**

- A. Provide Observations: For structure where one or more of the following conditions exist:
  - 1. Such observation is required by the registered design professional responsible for the structural design.
  - 2. Such observation is specifically required by AHJ.

**3.10 SPECIAL ARCHITECTURAL INSPECTIONS**

- A. Signs and/or identification devices:
  - 1. Prior to issuance of a final Certificate of Occupancy, Enforcing Agency shall verify installation of signs for information content, appearance, location and Braille per CBC 11B-703.1.1.2.
    - a. Inspection shall include, but not limited to:
      - 1) Braille dots and cells are properly spaced and the size proportion and type raised characters are in compliance with these regulations.
      - 2) Tactile exit signage per CBC 1013.4 and 11B-216.4.1 Exit doors.
      - 3) Tactile floor designation signs in stairways per CBC 1023.9 Stairway identification signs.
      - 4) Tactile special egress control device signs per CBC 1010.1.9.7 Delayed Egress Locks, item 5.1.
      - 5) Elevator car control identification per CBC 11B-407.4.6-8 Elevator car controls.
      - 6) Sanitary facilities signage per CBC 11B-216.8 Toilet rooms and bathing rooms; and 11B-703.7.2.6 Toilet and bathing facilities geometric symbols.

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- B. Water-resistive barrier coating:
  - 1. Installation over sheathing substrate per ASTM E2570/E2570M.
- C. Glass and glazing identification:
  - 1. Verify installation of manufacturer’s material mark inspection per CBC 2403.1.
    - a. Safety glazing shall be labeled per CBC 2406.3.

**3.11 SPECIAL INSPECTION AGENCY DUTIES AND RESPONSIBILITIES**

- A. Special Inspection Agency shall:
  - 1. Verify samples submitted by Contractor comply with the referenced standards and the approved Contract Documents.
  - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 3. Perform specified sampling and testing of products in accordance with specified reference standards.
  - 4. Ascertain compliance of materials and products with requirements of Contract Documents.
  - 5. Promptly notify Architect, SEOR, IOR, DSA, District and Contractor of observed irregularities or non-conformance of work or products.
  - 6. Perform additional tests and inspections required by Architect.
  - 7. Submit reports of all tests or inspections specified.
- B. Limits on Special Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Agency may not approve or accept any portion of the work.
  - 3. Agency may not assume any duties of Contractor.
  - 4. Agency has no authority to stop the work.
- C. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- D. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

**3.12 TESTING AGENCY DUTIES AND RESPONSIBILITIES**

- A. Testing Agency Duties:
  - 1. Test samples submitted by Contractor.
  - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 3. Perform specified sampling and testing of products in accordance with specified standards.
  - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.

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5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
  6. Perform additional tests and inspections required by Architect.
  7. Attend preconstruction meetings and progress meetings.
  8. Submit reports of all tests or inspections specified.
- B. Limits on Testing or Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  2. Agency may not approve or accept any portion of the work.
  3. Agency may not assume any duties of Contractor.
  4. Agency has no authority to stop the work.
- C. Immediately upon determination of a test failure, the Laboratory shall telephone the results to the Architect. On the same day, Laboratory shall send test results by email to the Architect and to all relevant responsible parties of the project team, and District's Inspector
- D. On instructions by Architect, perform re-testing required because of non-compliance with specified requirements, using the same agency.
- E. Contractor will pay for re-testing required because of non-compliance with specified requirements.
- F. At the completion of the project, Testing Laboratory shall certify in writing and on all required DSA forms, that all work specified or required to be tested and inspected conforms to drawings, specifications and applicable building codes.
1. See DSA Procedure PR 13-01.
- G. Duties of the Laboratory of Record related to the use of form DSA 152 are as follows:
1. Meet with the Project Inspector, design professionals, and contractor as needed to mutually communicate and understand the testing and inspection program and the methods of communication appropriate for the project.
  2. Obtain a copy of the DSA approved construction documents from the design professional in general responsible charge prior to the commencement of construction
  3. Obtain a copy of the DSA approved Statement of Structural Tests and Special Inspections (form DSA 103) from the design professional in general responsible charge prior to the commencement of construction.
  4. Report all project related activities to the Project Inspector. The Project Inspector is responsible for monitoring the work of the Laboratory of Record and Special Inspectors to ensure the testing and special inspection program is satisfactorily completed
  5. Provide material testing as identified in the DSA approved construction documents.
  6. Submit test reports to the Project Inspector on the day the tests were performed for any tests performed on-site
  7. Submit material test reports in a timely manner such that construction is not delayed and not to exceed 14 days from the date the material tests were performed. Test reports are to be submitted to DSA, the Architect, structural engineer, Project Inspector and school district.

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- a. As a convenience, and if agreed upon by involved parties, the test reports may be submitted electronically as identified in Section 4 of this procedure.
- 8. Immediately submit reports of material tests not conforming to the requirements of the DSA approved construction documents. These reports shall be submitted to the DSA, Architect, structural engineer, Project Inspector and school district.
- 9. The Engineering Manager shall submit an interim Laboratory of Record Verified Report (form DSA 291) and the Geotechnical Engineer shall submit an interim Geotechnical Verified Report (form DSA 293) to DSA, the project inspector, school district and the Design Professional in General Responsible Charge.
  - a. The reports are required to be submitted upon any of the following events occurring:
    - 1) Within 14 days of the completion of the material testing/special inspection program.
    - 2) Work on the project is suspended for a period of more than one month.
    - 3) The services of the laboratory of record are terminated for any reason prior to completion of the project.
    - 4) The DSA requests a Verified Report. (See interim verified reports below. This is a "DSA request.")
- 10. The Engineering Manager shall submit an interim verified report (form DSA 291) and the Geotechnical Engineer shall submit form DSA 293 to DSA and a copy to the project inspector for each of the applicable sections of the form DSA 152, prior to the project inspector signing off that section of the project inspection card, if that section required material testing. The sections are:
  - a. Initial Site Work
  - b. Foundation Prep
  - c. Vertical Framing
  - d. Horizontal Framing
  - e. Appurtenances
  - f. Finish Site Work
  - g. Other Work
  - h. Final
- H. Duties of Special Inspectors, employed by the Laboratory of Record, related to the use of form DSA 152 are as follows:
  - 1. Meet with the Project Inspector, design professionals, and contractor as needed to mutually communicate and understand the testing and inspection program and the methods of communication appropriate for the project.
  - 2. Report all project related activities to the Project Inspector. The Project Inspector is responsible for monitoring the work of the Laboratory of Record and Special Inspectors to ensure the testing and special inspection program is satisfactorily completed.
  - 3. Perform work under the supervision of the Engineering Manager for the Laboratory of Record

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4. Perform inspections in conformance with the DSA approved construction documents, applicable codes and code reference standards
  5. Prepare detailed daily inspection reports outlining the work inspected and provide the Project Inspector a copy of the reports on the same day the inspections were performed.
  6. Prepare detailed daily inspection reports outlining the work inspected and provide the Project Inspector a copy of the reports on the same day the inspections were performed.
  7. Immediately submit reports of materials or work not conforming to the requirements of the DSA approved construction documents. These reports shall be submitted to the DSA, Architect, structural engineer, Project Inspector and school district.
  8. Submit daily special inspection reports in a timely manner such that construction is not delayed and not to exceed 14 days from the date the special inspections were performed. The reports are to be submitted to the Architect, structural engineer, Project Inspector and school district.
  9. Submit Verified Report forms DSA 292 to the DSA, Project Inspector, district and design professional in responsible charge.
  10. The reports are required to be submitted upon any of the following events occurring:
    11. Within 14 days of the completion of the special inspection work.
    12. Work on the project is suspended for a period of more than one month.
    13. The services of the special inspector are terminated for any reason prior to completion of the project.
    14. The DSA requests a Verified Report. (See interim verified reports below. This is a “DSA request”)
    15. Submit an interim Verified Report (form DSA 292) to the DSA and a copy to the Project Inspector for each of the applicable sections of the form DSA 152, prior to the Project Inspector signing off that section of the project inspection card, if that section required special inspections. The sections are:
      - a. Initial Site Work
      - b. Foundation
      - c. Vertical Framing
      - d. Horizontal Framing
      - e. Appurtenances
      - f. Non-Building Site Structures
      - g. Finish Site Work
      - h. Other Work
      - i. Final
  16. The Verified Reports shall be sent electronically to the DSA.
- I. Duties of Special Inspectors, not employed by the Laboratory of Record, related to the use of form DSA 152 are as follows:
1. Meet with the project inspector, Laboratory of Record, the design professionals, and the contractors as needed to mutually communicate and understand the testing and

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inspection program, and the methods of communication appropriate for the project.

2. Report all project related activities to the project inspector. The project inspector is responsible for monitoring the work of the Laboratory of Record and special inspectors to ensure the testing and special inspection program is satisfactorily completed.
3. Perform work under the direction of the design professional in general responsible charge, as defined in Section 4-335(f)1B of the California Administrative Code (Title 24, Part 1).
4. Perform inspections in conformance with the DSA approved construction documents, applicable codes and code reference standards.
5. Prepare detailed daily inspection reports outlining the work inspected and provide the project inspector a copy of the reports on the same day the inspections were performed.
6. Immediately submit reports of materials or work not conforming to the requirements of the DSA approved construction documents. These reports shall be submitted to DSA, the Architect, structural engineer, project inspector and the school district.
7. Submit daily special inspection reports in a timely manner such that construction is not delayed and not to exceed 14 days from the date the special inspections were performed. The reports are to be submitted to DSA, the Architect, structural engineer, project inspector and the school district.
8. Submit Special Inspection Verified Report forms DSA 292 to DSA, the project inspector, the school district and the Design Professional in General Responsible Charge.
  - a. The reports are required to be submitted upon any of the following events occurring:
    - 1) Within 14 days of the completion of the special inspection work.
    - 2) Work on the project is suspended for a period of more than one month.
    - 3) The services of the special inspector are terminated for any reason prior to completion of the project.
    - 4) DSA requests a verified report. (See interim verified reports below. This is a "DSA request.")
9. Submit an interim Special Inspection Verified Report (form DSA 292) to DSA and a copy to the project inspector for each of the applicable sections of the form DSA 152, prior to the project inspector signing off that section of the project inspection card, if that section required special inspections.
  - a. The sections are:
    - 1) Initial Site Work
    - 2) Foundation Prep
    - 3) Vertical Framing
    - 4) Horizontal Framing
    - 5) Appurtenances
    - 6) Finish Site Work
    - 7) Other Work
    - 8) Final

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**3.13 CONTRACTOR DUTIES AND RESPONSIBILITIES**

A. DSA Requirements:

1. Each Multi-Prime Contractor or Subcontractor shall comply with DSA Construction Oversight Procedure PR 13-01. California Code of Regulations (CCR), Title 24, Part 1, CCR, Chapter 4, Article 1 (Sections 4-211 through 4-220) and Group1, Articles 5 and 6 (Sections 4-331 through 4-344) which provide regulations governing the construction process for projects under the jurisdiction of the Division of the State Architect (DSA).
  - a. Assist the Project Inspector (IOR) and complete and fill out the following forms during the course of construction.
    - 1) Form-102-IC: Construction Start Notice/ Inspection Card Request: Verify Project Inspector has an active form issued by DSA.
    - 2) Form-151: Project Inspector Notifications: Contractor to notify IOR and assist.
    - 3) Form-152: Project Inspection Card: See below.
    - 4) Form-154: Notice of Deviations/ Resolution of Deviations: Contractor to verify all deviations are reviewed, corrected, and accepted by the design professional, and filed with DSA through the Project Inspector (IOR).
      - (a) When the Project Inspector identifies deviations from the DSA approved construction documents the inspector must verbally notify the contractor. If the deviations are not corrected within a reasonable time frame, the inspector is required to promptly issue a written notice of deviation to the contractor, with a copy sent to the design professional in general responsible charge and the DSA.
      - (b) When the noticed deviations are corrected, the inspector is required to promptly issue a written notice of resolution to the contractor, with a copy sent to the design professional in general responsible charge and the DSA.
      - (c) Deviations include both construction deviations and material deficiencies.
      - (d) The written notice of deviations shall be made using form DSA 154.
      - (e) The notice of resolution of deviations shall be made using the original form DSA 154 that reported the deviations.
    - 5) Form-156: Commencement/Completion of Work Notification
    - 6) Form-6.C: Verified Report – Contractor: From each contractor having a contract with the school board.
2. Duties of Contractor related to the use of form DSA 152 are as follows:
  - a. The Contractor shall carefully study the DSA approved documents and shall plan a schedule of operations well ahead of time.
  - b. If at any time it is discovered that work is being done which is not in accordance with the DSA approved construction documents, the Contractor shall correct the work immediately.
  - c. Verify that forms DSA 152 are issued for the project prior to the commencement of construction.
  - d. Meet with the design team, the Laboratory of Record and the Project Inspector to mutually communicate and understand the testing and inspection program and the

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methods of communication appropriate for the project.

- e. Notify the Project Inspector, in writing, of the commencement of construction of each and every aspect of the work at least 48 hours in advance by submitting form DSA 156 (or other agreed upon written documents) to the Project Inspector.
- f. Notify the Project Inspector of the completion of construction of each and every aspect of the work by submitting form DSA 156 (or other agreed upon written documents) to the Project Inspector.
- g. Consider the relationship of the signed off blocks and sections of the form DSA 152 and the commencement of subsequent work. Until the Project Inspector has signed off applicable blocks and sections of the form DSA 152, the Contractor may be prohibited from proceeding with subsequent construction activities that cover up the unapproved work. Any subsequent construction activities, that cover up the unapproved work, will be subject to a "Stop Work Order" from the DSA or the district and are subject to removal and remediation if found to be in non-compliance with the DSA approved construction documents.
- h. Submit the final verified report. All prime contractors are required to submit final Contractor Verified Reports (form DSA 6-C) to DSA and the project inspector.
  - 1) The reports are required to be submitted upon any of the following events occurring:
    - (a) The project is substantially complete. DSA considers the project to be complete when the construction is sufficiently complete in accordance with the DSA approved construction documents so that the owner can occupy or utilize the project.
    - (b) Work on the project is suspended for a period of more than one month.
    - (c) The services of the contractor are terminated for any reason prior to the completion of the project.
    - (d) DSA requests a verified report.

**B. Contractor Responsibilities, General:**

- 1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
- 2. Availability of Samples
  - a. Contractor shall make materials required for testing available to Laboratory and assist in acquiring these materials as directed by the District's Inspector. The samples shall be taken under the immediate direction and supervision of the Testing Laboratory or District's Inspector.
  - b. If work which is required to be tested or inspected is covered up without prior notice or approval, such work may be uncovered at the discretion of Architect at no additional cost to the District. Refer to paragraph "Payments" herein.
  - c. Unless otherwise specified, Contractor shall notify Testing Laboratory a minimum of 10 working days in advance of all required tests, and a minimum of 2 working days in advance of all required inspections. All extra expenses resulting from a failure to notify the Laboratory will be paid by the District and backcharged to the Contractor.

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- d. Contractor shall give sufficient advance notice to Testing Laboratory in the event of cancellation or time extension of a scheduled test or inspection. Charges due to insufficient advance, notice of cancellations, or time extension will be paid for by the District and backcharged to the Contractor.
- 3. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.
- 4. Provide incidental labor and facilities:
  - a. To provide access to work to be tested or inspected.
  - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
  - c. To facilitate tests or inspections.
  - d. To provide storage and curing of test samples.
- 5. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.
- 6. Arrange with District's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 7. The Contractor shall notify the District's Inspector a minimum of 5 working days in advance of the manufacture of material to be supplied by him under the Contract Documents, which must be by terms of the Contract be tested, in order that the District may arrange for the testing of such material at the source of supply.
- 8. Material shipped by the Contractor from the source of supply before having satisfactorily passed such testing and inspection or before the receipt of notice from said Inspector that such testing and inspection will not be required, shall not be incorporated in the Project.
- 9. The District will select and pay testing laboratory costs for all tests and inspections, but may be reimbursed by the Contractor for such costs under the Contract conditions. Any direct payments by the Contractor to the testing laboratory on this project is prohibited.
- C. Contractor shall submit a written statement of responsibility to comply with CBC section 1704A.4.
  - 1. Each contractor responsible for the construction of a main wind- or seismic-force-resisting system, designated seismic system or a wind- or seismic-resisting component listed in the statement of special inspections shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:
    - a. Acknowledgment of awareness of the special requirements contained in the statement of special inspections;
    - b. Acknowledgment that control will be exercised to obtain conformance with the construction documents approved by the building official;
    - c. Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports; and

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- d. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.
- D. Contractor Responsibilities, Seismic Force-Resisting System, Designated Seismic System, and Seismic Force-Resisting Component: Submit written statement of responsibility for each item listed in the Statement of Special Inspections to AHJ and District prior to starting work. Statement of responsibility shall acknowledge awareness of special construction requirements and other requirements listed.
- E. Contractor Responsibilities, Wind Force-Resisting System and Wind Force-Resisting Component: Submit written statement of responsibility for each item listed in the Statement of Special Inspections to AHJ and District prior to starting work. Statement of responsibility shall acknowledge awareness of special construction requirements and other requirements listed.
- F. Unless otherwise directed, materials not conforming to the requirements of Contract Documents shall be promptly removed from the Project site.

**3.14 MANUFACTURERS' AND FABRICATORS' FIELD SERVICES**

- A. When specified in individual specification sections, require material suppliers, assembly fabricators, or product manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, to test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect 30 days in advance of required observations.
  - 1. Observer subject to approval of Architect.
  - 2. Observer subject to approval of District.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

**END OF SECTION**

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**SECTION 01 50 00  
TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Security requirements.
- E. Waste removal facilities and services.
- F. Project identification sign.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 35 53 - Security Procedures
- B. Section 01 51 00 - Temporary Utilities.
- C. Section 01 57 19 - Temporary Environmental Controls: Filtration requirements during construction and final cleaning.

**1.03 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 1. Use 2013a as indicated in 2016 CBC Referenced Standards.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

**1.04 TEMPORARY UTILITIES - SEE SECTION 01 51 00**

- A. District will provide the following:
  - 1. Electrical power and metering, consisting of connection to existing facilities.
  - 2. Water supply, consisting of connection to existing facilities.
- B. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

**1.05 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:

**1.06 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

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1. Provide temporary toilet facilities if maximum number of personnel on project is greater than 10.
  2. Submit proposed location of temporary toilet(s) to DSA for approval.
    - a. Place on-site portable toilets away from building air intakes and entryway.
- B. Maintain daily in clean and sanitary condition.

**1.07 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

**1.08 FENCING**

- A. Construction: Contractor's option.
- B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

**1.09 EXTERIOR ENCLOSURES**

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

**1.10 INTERIOR ENCLOSURES**

- A. Provide temporary partitions and ceilings as indicated to separate work areas from District-occupied areas, to prevent penetration of dust and moisture into District-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:
  1. STC rating of 35 in accordance with ASTM E90.
  2. Maximum flame spread rating of 75 in accordance with ASTM E84.
- C. Paint surfaces exposed to view from District-occupied areas.

**1.11 SECURITY**

- A. Provide security and facilities to protect Work, existing facilities, and District's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with District's security program.

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**1.12 CAFETERIA AND FOOD**

- A. Construction personnel shall police their own areas. All cups, cans, paper, wrappers, and discarded food must be placed in trash receptacles at end of each break.
- B. Contractor(s) shall submit to DSA proposed location of any break areas and eating areas for approval.

**1.13 SMOKING AND TOBACCO**

- A. Smoking and vaping is not permitted on school property.
- B. No chewing tobacco or spitting of tobacco is permitted.

**1.14 VEHICULAR ACCESS AND PARKING**

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and District.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

**1.15 WASTE REMOVAL**

- A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
- B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- C. Provide containers with lids. Remove trash from site periodically.
- D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

**1.16 PROJECT IDENTIFICATION**

- A. Provide project identification sign of design and construction indicated on drawings.
- B. Erect on site at location indicated.
- C. No other signs are allowed without District permission except those required by law.

**1.17 FIELD OFFICES**

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Provide separate private office similarly equipped and furnished, for use of District.

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- D. Provide separate private office similarly equipped and furnished, for use of Architect and District.
- E. Locate offices a minimum distance of 30 feet from existing and new structures.

**1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Restore new permanent facilities used during construction to specified condition.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 51 00  
TEMPORARY UTILITIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 50 00 - Temporary Facilities and Controls:
  - 1. Temporary telecommunications services for administrative purposes.
  - 2. Temporary sanitary facilities required by law.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - Safety and Health Regulations for Construction.

**1.04 TEMPORARY ELECTRICITY**

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Power Service Characteristics: 480 volt, 200 ampere, three phase, four wire.
- D. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
- E. Provide main service disconnect and over-current protection at convenient location and meter.
- F. Permanent convenience receptacles may be utilized during construction.
- G. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

**1.05 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES**

- A. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.
- B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be utilized during construction.

**1.06 TEMPORARY HEATING**

- A. Cost of Energy: By Contractor.

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- B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- D. Existing facilities shall not be used.
- E. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

**1.07 TEMPORARY COOLING**

- A. Cost of Energy: By Contractor.
- B. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
- C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- D. Existing facilities shall not be used.

**1.08 TEMPORARY VENTILATION**

- A. Existing ventilation equipment may not be used.

**1.09 TEMPORARY WATER SERVICE**

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Connect to existing water source.
  - 1. Exercise measures to conserve water.
- D. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 52 13  
FIELD OFFICES AND SHEDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary field offices for use of Contractor.
- B. Maintenance and removal.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: use of premises and responsibility for providing field offices.
- B. Section 01 50 00 - Temporary Facilities and Controls:
  - 1. Temporary telecommunications services for administrative purposes.
  - 2. Temporary sanitary facilities required by law.
- C. Section 01 55 00: Parking and access to field offices.

**1.03 USE OF EXISTING FACILITIES**

- A. Existing facilities shall not be used for field offices.

**1.04 USE OF PERMANENT FACILITIES**

- A. Permanent facilities shall not be used for field offices.

**PART 2 PRODUCTS**

**2.01 MATERIALS, EQUIPMENT, FURNISHINGS**

- A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

**2.02 CONSTRUCTION**

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove when no longer needed.
- C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy requirements.
- D. Exterior Materials: Weather resistant, finished in one color.
- E. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- F. Lighting for Offices: 50 fc at desk top height, exterior lighting at entrance doors.
- G. Fire Extinguishers: Appropriate type fire extinguisher at each office.

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**2.03 ENVIRONMENTAL CONTROL**

- A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions.

**2.04 CONTRACTOR OFFICE AND FACILITIES**

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Telephone: As specified in Section 01 50 00.
- C. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- D. Other Furnishings: Contractor's option.
- E. Equipment: Six adjustable band protective helmets for visitors, one 10 inch outdoor weather thermometer .

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

**3.02 INSTALLATION**

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.

**3.03 MAINTENANCE AND CLEANING**

- A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.
- B. Maintain approach walks free of mud, water, and snow.

**3.04 REMOVAL**

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

**END OF SECTION**

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**SECTION 01 55 00  
VEHICULAR ACCESS AND PARKING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Access roads.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Permanent pavements and parking facilities.
- E. Construction parking controls.
- F. Flag persons.
- G. Flares and lights.
- H. Haul routes.
- I. Traffic signs and signals.
- J. Maintenance.
- K. Removal, repair.
- L. Mud from site vehicles.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: For access to site, work sequence, and occupancy.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Temporary Construction: Contractor's option.
- B. Materials for Permanent Construction: As specified in product specification sections, including earthwork, paving base, and topping.

**2.02 SIGNS, SIGNALS, AND DEVICES**

- A. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- B. Flag Person Equipment: As required by local jurisdictions.

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.
- B. Limit the number of haul trucks on site and establish a haul route. Install a gravel or base road on site for loading trucks. Haul route shall be reviewed and approved by DSA.

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- C. Provide a boundary/zone where equipment shall not enter because of proximity to active adjacent operation, and if necessary, equipment shall operate on alternative fuel to reduce diesel particulate matter.
- D. Establish construction site and access road speed limits and enforce them during the construction period.
- E. Restrict the hours of material transport to the periods and days permitted by both this contract and local noise or other applicable ordinance.
- F. Schedule haul trucks and material delivery trucks to prevent traffic congestion and impede the normal operation of the Facility. Set up truck queuing area away from public entrances.

**3.02 ACCESS ROADS**

- A. Use of existing on-site streets and driveways for construction traffic is permitted.
- B. Tracked vehicles not allowed on paved areas.
- C. Extend and relocate as work progress requires, provide detours as necessary for unimpeded traffic flow.
- D. Provide unimpeded access for emergency vehicles. Maintain 20 foot width driveways with turning space between and around combustible materials.
- E. Provide and maintain access to fire hydrants free of obstructions.

**3.03 PARKING**

- A. Use of designated areas of existing parking facilities by construction personnel is permitted.
  - 1. DSA will meet with Contractor(s) to determine parking requirements.
- B. DSA will notify security of parking area to be used by construction personnel if at variance with this procedure.
- C. Use of designated areas of new parking facilities by construction personnel is permitted.
- D. Contractor(s) and related personnel shall park in authorized areas only.
- E. Do not allow heavy vehicles or construction equipment in parking areas.
- F. Arrange for temporary parking areas to accommodate use of construction personnel.
- G. When site space is not adequate, provide additional off-site parking.

**3.04 PERMANENT PAVEMENTS AND PARKING FACILITIES**

- A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.
- B. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.

**3.05 CONSTRUCTION PARKING CONTROL**

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and District's operations.
- B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

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**3.06 FLAG PERSONS**

- A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

**3.07 FLARES AND LIGHTS**

- A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

**3.08 HAUL ROUTES**

- A. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

**3.09 TRAFFIC SIGNS AND SIGNALS**

- A. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
- B. Relocate as work progresses, to maintain effective traffic control.

**3.10 MAINTENANCE**

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

**3.11 REMOVAL, REPAIR**

- A. Remove underground work and compacted materials to a depth of 2 feet; fill and grade site as specified.
- B. Repair existing facilities damaged by use, to original condition.
- C. Remove equipment and devices when no longer required.
- D. Repair damage caused by installation.
- E. Remove post settings to a depth of 2 feet.

**3.12 MUD FROM SITE VEHICLES**

- A. Provide means of removing mud from vehicle wheels before entering streets.

**END OF SECTION**

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**SECTION 01 60 00  
PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General product requirements.
  - 1. System Completeness.
  - 2. Installation of Products.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Procedures for District-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Identification of District-supplied products.
- B. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 01 40 00 - Quality Requirements: Product quality monitoring.
- D. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- E. Section 01 74 19 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.
- F. Divisions 31 - 33: Sitework.

**1.03 REFERENCE STANDARDS**

- A. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; California Department of Public Health.
- B. NFPA 70 - National Electrical Code.
  - 1. Use California Electrical Code.

**1.04 SUBMITTALS**

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
  - 1. Submit within 15 days after date of Agreement.
  - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers'

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standard data to provide information specific to this Project.

- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

**1.05 QUALITY ASSURANCE**

- A. CAL (CDPH SM) v1.1: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v. 1.1–2010, for the emissions testing and requirements of products and materials.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Drawings and Specifications:
  - 1. If a conflict exists between the Drawings and the Specifications (Project Manual), then the Contractor shall submit a Request for Interpretation from the Architect. See Section 01 30 00 - Administrative Requirements.
    - a. As noted in the General Conditions, the more stringent requirements shall govern, including cost of materials and/or installation.
  - 2. If a specific product is indicated on the Drawings for use, then that product shall be used without exception in the location identified.
  - 3. If the Contractor proposes the use of another product other than the item indicated, whether or not listed in these specifications, the Contractor shall submit the product using the complete substitution process. See the the Article titled "SUBSTITUTIONS".
  - 4. DSA ((Project City)) approval is also required prior to the use or installation of any substitution, on any product or location of product (requiring a revision to the Drawings or Specifications), included in these construction documents.
    - a. Installation of a non-approved product may result in the Contractor removing and replacing the non-approved product at the Contractor's own expense. See Section 01 20 00 - Price and Payment Procedures.
- B. General: Items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock, and include materials, equipment, assemblies, fabrications and systems.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model designations indicated in the manufacturer's published product data.
  - 2. Materials: Products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed or installed to form a part of the Work.

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- 3. Equipment: A product with operating parts, whether motorized or manually operated, that requires connections such as wiring or piping.
- C. Specific Product Requirements: Refer to requirements of Section 01 40 00 - Quality Requirements and individual product Specifications Sections in Divisions 2 through 33 for specific requirements for products.
- D. Minimum Requirements: Specified requirements for products are minimum requirements. Refer to general requirements for quality of the Work specified in Section 01 40 00 - Quality Requirements and elsewhere herein.
- E. Standard Products:
  - 1. Where specific products are not specified, provide standard products of types and kinds that are suitable for the intended purposes and that are usually and customarily used on similar projects under similar conditions.
  - 2. Products shall be as selected by Contractor and subject to review and acceptance by the District and Architect.
- F. Product Completeness:
  - 1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
  - 2. Comply with additional requirements specified herein in Article titled "SYSTEM COMPLETENESS".
- G. Code Compliance:
  - 1. All products, other than commodity products prescribed by Code, shall have a current ICC Evaluation Service Research Report (ICC ESR), CABO National Evaluation Report (NER), or other testing agencies as accepted by the Division of the State Architect.
  - 2. Refer to additional requirements specified in Section 01 41 00 - Regulatory Requirements.

**2.02 SYSTEM COMPLETENESS**

- A. The Contract Drawings and Specifications are not intended to be comprehensive directions on how to produce the Work. Rather, the Drawings and Specifications are instruments of service prepared to describe the design intent for the completed Work.
- B. It is intended that all equipment, systems and assemblies be complete and fully functional even though not fully described. Provide all products and operations necessary to achieve the design intent described in the Contract Documents.
- C. Refer to related general requirements specified in Section 01 41 00 - Regulatory Requirements regarding compliance with minimum requirements of applicable codes, ordinances and standards.
- D. Omissions and Misdescriptions: Contractor shall report to Architect immediately when elements essential to proper execution of the Work are discovered to be missing or misdescribed in the Drawings and Specifications or if the design intent is unclear.
  - 1. Should an essential element be discovered as missing or misdescribed prior to receipt of Bids, an Addendum will be issued so that all costs may be accounted for in the Contract Sum.

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2. Should an obvious omission or misdescription of a necessary element be discovered and reported after execution of the Agreement, Contractor shall provide the element as though fully and correctly described, and a no-cost Change Order shall be executed.
3. Refer to related General Conditions or general requirements specified in Section 01 30 00 - Administrative Requirements and 01 31 14 - Facility Services Coordination regarding construction interfacing and coordination.

**2.03 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.
  1. Provide products that fully comply with the Contract Documents, are undamaged and unused at installation.
  2. Comply with additional requirements specified herein in Article titled "PRODUCT OPTIONS".
- B. Use of products having any of the following characteristics is not permitted:
  1. Made outside the United States, its territories, Canada, or Mexico.
  2. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, Contractor shall give preference to products that:
  1. If used on interior, have lower emissions, as defined in Section 01 61 16.
  2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.
  3. Are extracted, harvested, and/or manufactured closer to the location of the project.
  4. Have longer documented life span under normal use.
  5. Result in less construction waste. See Section 01 74 19
- D. Provide interchangeable components of the same manufacture for components being replaced.
  1. To the fullest extent possible, provide products of the same kind from a single source. Products required to be supplied in quantity shall be the same product and interchangeable throughout the Work.
  2. When options are specified for the selection of any of two or more products, provide product selected to be compatible with products previously selected.
- E. Product Nameplates and Instructions:
  1. Except for required Code-compliance labels and operating and safety instructions, locate nameplates on inconspicuous, accessible surfaces. Do not attach manufacturer's identifying nameplates or trademarks on surfaces exposed to view in occupied spaces or to the exterior.
  2. Provide a permanent nameplate on each item of service-connected or power-operated equipment. Nameplates shall contain identifying information and essential operating data such as the following example:
    - a. Name of manufacturer
    - b. Name of product
    - c. Model and serial number
    - d. Capacity

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- e. Operating and Power Characteristics
- f. Labels of Tested Compliance with Codes and Standards
- 3. Refer to additional requirements which may be specified in various sections, as included in this Project Manual.
- 4. For each item of service-connected or power-operated equipment, provide operating and safety instructions, permanently affixed and of durable construction, with legible machine lettering. Comply with all applicable requirements of authorities having jurisdiction and listing agencies.
- F. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to CEC, include lugs for terminal box.
- G. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

**2.04 PRODUCT OPTIONS**

- A. Unless the specifications state that no substitution is permitted, whenever the Contract Documents indicate any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction or any specific name, make, trade name, or catalog number, with or without the words "or equal," such specification shall be deemed to be used for the purpose of facilitating description of the material, process, or article desired and shall be deemed to be followed by the words "or equal."
  - 1. See Section 01 25 00 - Substitution Procedures.
- B. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
  - 1. Reference Standards:
    - a. Where Specifications require compliance with a standard, provided product shall fully comply with the standard specified.
    - b. Refer to general requirements specified in Section 01 42 19 - Reference Standards regarding compliance with referenced standards, standard specifications, codes, practices and requirements for products.
  - 2. Product Description:
    - a. Where Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that has the specified attributes and otherwise complies with specified requirements.
  - 3. Performance Requirements:
    - a. Where Specifications require compliance with performance requirements, provide product(s) that comply and are recommended by the manufacturer for the intended application.
    - b. Verification of manufacturer's recommendations may be by product literature or by certification of performance from manufacturer.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

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- D. Products Specified by Identification of Manufacturer and Product Name or Number:
1. "Specified Manufacturer": Provide the specified product(s) of the specified manufacturer.
    - a. If only one manufacturer is specified, without "acceptable manufacturers" being identified, provide only the specified product(s) of the specified manufacturer.
    - b. If District standard is indicated make all efforts to provide that product.
    - c. If the phrase "or equal" or "approved equal" is stated or reference is made to the "or equal provision," products of other manufacturers may be provided if such products are equivalent to the specified product(s) of the specified manufacturer.
      - 1) Equivalence shall be demonstrated by submission of information in compliance with requirements of Section 01 25 00 - Substitution Procedures.
  2. "Acceptable Manufacturers":
    - a. Product(s) of the named manufacturers, if equivalent to the specified product(s) of the specified manufacturer, will be acceptable in accordance with the requirements of Section 01 25 00 - Substitution Procedures.
      - 1) Exception: Considerations regarding changes in Contract Time and Contract Sum will be waived if no increase in Contract Time or Contract Sum results from use of such equivalent products.
  3. Unnamed manufacturers: Product(s) of unnamed manufacturers will be acceptable when disclosed during the bidding period and only as follows:
    - a. Unless specifically stated that substitutions will not be accepted or considered, the phrase "or equal" shall be assumed to be included in the description of specified product(s).
    - b. Equivalent products of unnamed manufacturers will be accepted in accordance with the "or equal" provision specified herein, below.
    - c. If provided, products of unnamed manufacturers shall be subject to the requirements of Section 01 25 00 - Substitution Procedures.
  4. Quality basis:
    - a. Specified product(s) of the specified manufacturer shall serve as the basis by which products by named acceptable manufacturers and products of unnamed manufacturers will be evaluated.
    - b. Where characteristics of the specified product are described, where performance characteristics are identified or where reference is made to industry standards, such characteristics are specified to identify the most significant attributes of the specified product(s) which will be used to evaluate products of other manufacturers.
- E. Products Specified by Combination of Methods: Where products are specified by a combination of attributes, including manufacturer's name, product brand name, product catalog or identification number, industry reference standard, or description of product characteristics, provide products conforming to all specified attributes.
- F. "Or Equal" Provision: Where the phrase "or equal" or the phrase "or approved equal" is included, equivalent product(s) of unnamed manufacturer(s) may be provided as specified above in subparagraph titled "Unnamed manufacturers" and Section 01 25 00 - Substitution

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Procedures with the following conditions:

1. The requirements of Section 01 25 00 - Substitution Procedures shall apply to products provided under the "or equal" provision.
  - a. Exception: If the proposed product(s) are determined to be equivalent to the specified product(s) of the specified manufacturer, the requirement specified for substitutions to result in a net reduction in Contract Time or Contract Sum will be waived.
2. Use of product(s) under the "or equal" provision shall not result in any delay in completion of the Work, including completion of portions of the Work for use by District or for work under separate contract by District.
3. Use of product(s) under the "or equal" provision shall not result in any costs to the District, including design fees and permit and plan check fees.
4. Use of product(s) under the "or equal" provision shall not require substantial change in the intent of the design, in the opinion of the Architect.
  - a. The intent of the design shall include functional performance and aesthetic qualities.
5. The determination of equivalence will be made by the Architect and District, and such determination shall be final.

G. Visual Matching:

1. Where Specifications require matching a sample, the decision by the Architect on whether a proposed product matches shall be final.
2. Where no product visually matches but the product complies with other requirements, comply with provisions for substitutions for selection of a matching product in another category.

H. Visual Selection of Products:

1. Where requirements include the phrase "as selected from manufacturer's standard colors, patterns and textures", or a similar phrase, selections of products will be made by indicated party or, if not indicated, by the Architect. The will select color, pattern and texture from the product line of submitted manufacturer, if all other specified provisions are met.
2. The Architect will select color, pattern and texture from the product line of submitted manufacturer, if all other specified provisions are met.

**2.05 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

**PART 3 EXECUTION**

**3.01 SUBSTITUTION LIMITATIONS**

- A. See Section 01 25 00 - Substitution Procedures.

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### 3.02 OWNER-SUPPLIED PRODUCTS

- A. See Section 01 10 00 - Summary for identification of District-supplied products.
- B. District's Responsibilities:
  - 1. Arrange for and deliver District reviewed shop drawings, product data, and samples, to Contractor.
  - 2. Arrange and pay for product delivery to site.
  - 3. On delivery, inspect products jointly with Contractor.
  - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
  - 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
  - 1. Review District reviewed shop drawings, product data, and samples.
  - 2. Receive and unload products at site; inspect for completeness or damage jointly with District.
  - 3. Handle, store, install and finish products.
  - 4. Repair or replace items damaged after receipt.

### 3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
  - 1. Schedule delivery to minimize long-term storage and prevent overcrowding construction spaces.
  - 2. Coordinate with installation to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport products by methods to avoid product damage.
- F. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- G. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- H. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- I. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

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### 3.04 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.
  - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Inspection Provisions: Arrange storage to provide access for inspection and measurement of quantity or counting of units.
- D. Structural Considerations: Store heavy materials away from the structure in a manner that will not endanger supporting construction.
- E. Store and protect products in accordance with manufacturers' instructions.
- F. Store with seals and labels intact and legible.
- G. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- H. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- I. For exterior storage of fabricated products, place on sloped supports above ground.
  - 1. Place products on raised blocks, pallets or other supports, above ground and in a manner to not create ponding or misdirection of runoff.
- J. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- K. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
  - 1. Periodically inspect to ensure products are undamaged, and are maintained under required conditions.
  - 2. Remove and replace products damaged by improper storage or protection with new products at no change in Contract Sum or Contract Time.
  - 3. Weather-Resistant Storage:
    - a. Store moisture-sensitive products above ground, under cover in a weathertight enclosure or covered with an impervious sheet covering. Provide adequate ventilation to avoid condensation.
    - b. Maintain storage within temperature and humidity ranges required by manufacturer's instructions.
    - c. Store loose granular materials on solid surfaces in a well-drained area. Prevent mixing with foreign matter.
- L. Comply with manufacturer's warranty conditions, if any.
- M. Do not store products directly on the ground.

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- N. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- O. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- P. Prevent contact with material that may cause corrosion, discoloration, or staining.
- Q. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- R. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**3.05 INSTALLATION OF PRODUCTS**

- A. Comply with manufacturer's instructions and recommendations for installation of products, except where more stringent requirements are specified, are necessary due to Project conditions or are required by authorities having jurisdiction.
- B. Anchor each product securely in place, accurately located and aligned with other Work.
- C. Clean exposed surfaces and provide protection to ensure freedom from damage and deterioration at time of Substantial Completion review. Refer to additional requirements specified in General Conditions, Section 01 50 00 - Temporary Construction Facilities and Controls and 01 70 00 - Execution and Closeout Requirements.

**3.06 PROTECTION OF COMPLETED WORK**

- A. Provide barriers, substantial coverings and notices to protect installed Work from traffic and subsequent construction operations.
- B. Remove protective measures when no longer required and prior to Substantial Completion review of the Work.
- C. Comply with additional requirements specified in Section 01 50 00 - Temporary Construction Facilities and Controls.

**END OF SECTION**

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**SECTION 01 61 16  
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.
- C. Requirement for installer certification that they did not use any non-compliant products.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- B. Section 01 40 00 - Quality Requirements: Procedures for testing and certifications.
- C. Section 01 60 00 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.
- D. Section 07 92 00 - Joint Sealants: Emissions-compliant sealants.

**1.03 DEFINITIONS**

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
  - 1. Interior paints and coatings applied on site.
  - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
  - 3. Flooring.
  - 4. Products making up wall and ceiling assemblies.
  - 5. Thermal and acoustical insulation.
  - 6. Other products when specifically stated in the specifications.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
  - 1. Exterior and interior paints and coatings.
  - 2. Exterior and interior adhesives and sealants, including flooring adhesives.
  - 3. Wet-applied roofing and waterproofing.
  - 4. Other products when specifically stated in the specifications.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the

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following:

1. Concrete.
2. Clay brick.
3. Metals that are plated, anodized, or powder-coated.
4. Glass.
5. Ceramics.
6. Solid wood flooring that is unfinished and untreated.

#### 1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
- C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers.
- D. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; California Air Resources Board.
- E. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board.
- F. CHPS (HPPD) - High Performance Products Database.
- G. CRI (GL) - Green Label Testing Program - Certified Products.
- H. CRI (GLP) - Green Label Plus Testing Program - Certified Products.
- I. GreenSeal GS-36 - Adhesives for Commercial Use.
- J. SCAQMD 1113 - Architectural Coatings.
- K. SCAQMD 1168 - Adhesive and Sealant Applications.
- L. SCS (CPD) - SCS Certified Products.
- M. UL (GGG) - GREENGUARD Gold Certified Products.

#### 1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
- C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of installer's products, or 2) that such products used comply with these requirements.
  1. Use the form following this section for installer certifications.
- D. Verification of compliance with VOC limits as specified in the CalGreen Code Section 5.504 shall be provided at the request of the Building Inspector.

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1. Product certification and specifications.
2. Chain of custody certifications.
3. Product, labeled and invoiced as meeting the Composite Wood Products regulation.
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards
5. Other methods approved by the building official.

**1.06 QUALITY ASSURANCE**

- A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
  1. Wet-Applied Products: State amount applied in mass per surface area.
  2. Paints and Coatings: Test tinted products, not just tinting bases.
  3. Evidence of Compliance: Acceptable types of evidence are the following;
    - a. Current UL (GGG) certification.
    - b. Current SCS (CPD) Floorscore certification.
    - c. Current SCS (CPD) Indoor Advantage Gold certification.
    - d. Current listing in CHPS (HPPD) as a low-emitting product.
    - e. Current CRI (GLP) certification.
    - f. Test report showing compliance and stating exposure scenario used.
  4. Product data submittal showing VOC content is NOT acceptable evidence.
  5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.
- B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
  1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Report of laboratory testing performed in accordance with requirements.
    - b. Published product data showing compliance with requirements.
    - c. Certification by manufacturer that product complies with requirements.
- C. Composite Wood Emissions Standard: CARB (ATCM) for ultra-low emitting formaldehyde (ULEF) resins.
  1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Current SCS "No Added Formaldehyde (NAF)" certification; [www.scs-certified.com](http://www.scs-certified.com).
    - b. Report of laboratory testing performed in accordance with requirements.
    - c. Published product data showing compliance with requirements.
    - d. Certification by manufacturer that product complies with requirements.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

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## 1.07 REGULATORY REQUIREMENTS

- A. All VOC restricted products shall be compliant with local jurisdiction, South Coast Air Quality Management District, Air Pollution Control District, County of San Diego, and California Green Standards Code, Rules and Regulations in effect at the time of installation. Products specified in this project shall be used as a basis of design. Updated products that are compliant with the rules in force at the time of installation shall be submitted as substitutions when they become available.
  - 1. If a product is found to be non-compliant with the VOC rules at the scheduled time of installation, notify the Architect a minimum of 90 days prior to installation. Contractor shall submit a suggested compliant product that is equal to the performance and cost of the specified product using the substitution procedure described in section 01 60 00 - Product Requirements.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. Indoor-Emissions-Restricted Products: Comply with Indoor Emissions Standard and Test Method, except for:
  - 1. Composite Wood, Wood Fiber, and Wood Chip Products: Comply with Composite Wood Emissions Standard or contain no added formaldehyde resins.
    - a. Comply with CalGreen Building Standards Section 5.504.4.5, Table 504.4.4.5 "Formaldehyde Limits".
  - 2. Inherently Non-Emitting Materials.
- C. VOC-Content-Restricted Products: VOC content not greater than required by the following:
  - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
  - 2. Aerosol Adhesives: GreenSeal GS-36.
  - 3. Joint Sealants: SCAQMD 1168 Rule.
  - 4. Paints and Coatings: Each color; most stringent of the following:
    - a. 40 CFR 59, Subpart D.
    - b. SCAQMD 1113 Rule.
    - c. CARB (SCM).
    - d. CalGreen Building Standards Section 5.504, Table 504.4.3 "VOC Content Limits for Architectural Coatings".
  - 5. Wet-Applied Roofing and Waterproofing: Comply with requirements for paints and coatings.
  - 6. Clear Wood Finishes, Floor Coatings, Stains, Primers and Shellacs: Do not exceed the VOC content limits established in SCAQMD 1113 rule.
  - 7. Carpet, Carpet Tile, and Adhesive: Provide products having VOC content not greater than that required for CRI (GLP) certification.

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- a. Comply with CalGreen Building Standards Section 5.504, Table 504.4.1 "Adhesive VOC Limit".
- 8. Carpet Cushion: Provide products having VOC content not greater than that required for CRI (GL) certification.
  - a. Comply with CalGreen Building Standards Section 5.504, Table 504.4.1 "Adhesive VOC Limit".
- D. Other Product Categories: Comply with limitations specified elsewhere.

**PART 3 EXECUTION**

**3.01 FIELD QUALITY CONTROL**

- A. District reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to District.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

**END OF SECTION**

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**SECTION 01 61 16.01**  
**ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM**

**1.01 PRODUCT CERTIFICATION**

- A. I certify that the installation work of my firm on this project:
  - 1. [HAS] [HAS NOT] required the use of any ADHESIVES.
  - 2. [HAS] [HAS NOT] required the use of any JOINT SEALANTS.
  - 3. [HAS] [HAS NOT] required the use of any PAINTS OR COATINGS.
  - 4. [HAS] [HAS NOT] required the use of any COMPOSITE WOOD or AGRIFIBER PRODUCTS.
- B. Product data and MSDS sheets are attached.

**2.01 CERTIFIED BY: (INSTALLER/MANUFACTURER/SUPPLIER FIRM)**

- A. Firm Name: \_\_\_\_\_
- B. Print Name: \_\_\_\_\_
- C. Signature: \_\_\_\_\_
- D. Title: \_\_\_\_\_ (officer of company)
- E. Date: \_\_\_\_\_

**END OF SECTION**

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**SECTION 01 70 00  
EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of District personnel.
- I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- J. General requirements for maintenance service.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures.
- C. Section 01 31 14 - Facility Services Coordination: Coordination of trades and BIM documents.
- D. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
- E. Section 01 45 33 - Code Required Special Inspections & Procedures: Construction oversight procedures by DSA regarding the execution, approval, and closeout of this building project.
- F. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.
- G. Section 01 50 00 - Temporary Facilities and Controls: Temporary interior partitions.
- H. Section 01 74 19 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
- I. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- J. Section 01 79 00 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- K. Section 02 41 00 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.
- L. Section 02 84 00 - Polychlorinate Biphenyl (PCB) Remediation: Removal of equipment containing substances regulated under the Federal Toxic Substances Control Act (TSCA),

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including but not limited to PCB- and mercury-containing equipment.

- M. Section 07 84 00 - Firestopping.
- N. Individual Product Specification Sections:
  - 1. Advance notification to other sections of openings required in work of those sections.
  - 2. Limitations on cutting structural members.

**1.03 REFERENCE STANDARDS**

- A. CFC Ch. 35 - California Fire Code - Chapter 35 - Welding and Other Hot Work.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of District or separate Contractor.
  - 6. Include in request:
    - a. Identification of Project.
    - b. Location and description of affected work. Include shop drawings as necessary to identify locations and communicate descriptions.
    - c. Necessity for cutting or alteration.
    - d. Description of proposed work and products to be used.
    - e. Effect on work of District or separate Contractor.
    - f. Effect on existing construction of District and, if applicable, work for Project being provided by District under separate contract.
    - g. Written permission of affected separate Contractor.
    - h. Date and time work will be executed.
  - 7. Include written evidence that those performing work under separate contract for District have been notified and acknowledge that cutting and patching work will be occurring. Include written permission for intended cutting and patching, included scheduled times.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

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### 1.05 QUALIFICATIONS

- A. For demolition work, employ a firm specializing in the type of work required.
  - 1. Minimum of 5 years of documented experience.
- B. For surveying work, employ a land surveyor registered in California and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,
- C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in California. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.
- D. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in California.

### 1.06 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
  - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
  - 1. Minimize amount of bare soil exposed at one time.
  - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
  - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
  - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
  - 1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
  - 2. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
- G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

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- H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

**1.07 COORDINATION**

- A. See Section 01 10 00 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After District occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of District's activities.

**PART 2 PRODUCTS**

**2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that existing conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

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- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

**3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.
- D. Temporary Supports: Provide supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- E. Weather Protection: Provide protection from elements for areas which may be exposed by uncovering Work. Maintain excavations free of water.

**3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of examination, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, District, participants, and those affected by decisions made.

**3.04 LAYING OUT THE WORK**

- A. Notify the District at least 48 hours before staking is to be started.
- B. Verify locations of survey control points prior to starting work.
- C. Promptly notify Architect of any discrepancies discovered.
- D. Contractor shall locate and protect survey control and reference points.
- E. Control datum for survey is that established by District provided survey.
- F. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- G. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

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- H. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- I. Utilize recognized engineering survey practices.
- J. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- K. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  - 2. Grid or axis for structures.
  - 3. Building foundation, column locations, ground floor elevations.
- L. Periodically verify layouts by same means.
- M. Maintain a complete and accurate log of control and survey work as it progresses.
- N. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

**3.05 GENERAL INSTALLATION REQUIREMENTS**

- A. Dimensions for Accessibility:
  - 1. Conventions: See CBC Figure 11B-104. Dimensions that are not stated as "maximum" or "minimum" are absolute.
  - 2. Tolerances shall be per CBC 11B-104.1.1 "Construction and manufacturing tolerances. All dimensions are subject to conventional industry tolerances except where the requirement is stated as a range with specific minimum and maximum end points."
- B. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- C. When welding or doing other hot work, comply with CFC Ch. 35.
- D. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- E. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- F. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- G. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- H. Make neat transitions between different surfaces, maintaining texture and appearance.

**3.06 ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as indicated.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.

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- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
  - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 .
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
  - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
  - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
  - 2. Remove items indicated on drawings.
  - 3. Relocate items indicated on drawings.
  - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
  - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
  - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
  - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    - b. Provide temporary connections as required to maintain existing systems in service.
  - 4. Verify that abandoned services serve only abandoned facilities.
  - 5. Remove abandoned pipe, ducts, conduits, and equipment , including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.

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1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
  2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
  3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
  4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
  2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean existing systems and equipment.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
- M. Comply with all other applicable requirements of this section.

### 3.07 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
  1. Complete the work.
  2. Fit products together to integrate with other work.
  3. Provide openings for penetration of mechanical, electrical, and other services.
  4. Match work that has been cut to adjacent work.
  5. Repair areas adjacent to cuts to required condition.
  6. Repair new work damaged by subsequent work.
  7. Remove samples of installed work for testing when requested.

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8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
  1. Coordinate installation or application of products for integrated Work.
  2. Uncover completed Work as necessary to install or apply products out of sequence.
  3. Remove and replace defective or non-conforming Work.
  4. Provide openings for penetration of utility services, such as plumbing, mechanical and electrical Work.
- E. After uncovering existing Work, inspect conditions affecting proper accomplishment of Work.
- F. Temporary Supports: Provide supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- G. Beginning of cutting or patching shall be interpreted to mean that existing conditions were found by Contractor to be acceptable.
- H. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- I. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
  1. Use a diamond grit abrasive saw or similar cutter for smooth edges. Do not overcut corners.
- J. Restore work with new products in accordance with requirements of Contract Documents.
- K. Fit work neat and tight allowing for expansion and contraction.
- L. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- M. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- N. Patching:
  1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  2. Match color, texture, and appearance.
  3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- O. Finishing: Refinish surfaces to match adjacent and similar finishes as used for the Project.
  1. For continuous surfaces, refinish to nearest intersection or natural break.
  2. For an assembly, refinish entire unit.

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**3.08 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

**3.09 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

**3.10 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, 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. Submit a written report that equipment or system has been properly installed and is functioning correctly.

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**3.11 PROJECT CLOSEOUT CONFERENCE**

- A. Schedule and conduct a project closeout conference, at a time convenient to District and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
  - 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  - 2. Attendees: Authorized representatives of District, Commissioning Authority (CxA), Architect, and relevant consultants; Contractor and project superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents.
    - b. Commissioning.
    - c. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - d. Submittal of written warranties.
    - e. Coordination of separate contracts.
    - f. District's partial occupancy requirements.
    - g. Installation of District's furniture, fixtures, and equipment.
    - h. Responsibility for removing temporary facilities and controls.
  - 4. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, District, participants, and those affected by decisions made.

**3.12 DEMONSTRATION AND INSTRUCTION**

- A. See Section 01 79 00 - Demonstration and Training.

**3.13 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

**3.14 FINAL CLEANING**

- A. Cleaning and Disposal Requirements, General: Conduct cleaning and disposal operations in compliance with all applicable codes, ordinances and regulations, including environmental protection laws, rules and practices.
- B. Execute final cleaning prior to final project assessment.
  - 1. Clean areas to be occupied by District prior to final completion before District occupancy.
- C. Substantial Completion Review Cleaning, General: Execute a thorough cleaning prior to Substantial Completion review by Architect and District. Employ experienced workers or professional cleaners for cleaning operations for Substantial Completion review.

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- D. Use cleaning materials that are nonhazardous.
  - 1. Cleaning Agents and Materials: Use only those cleaning agents and materials which will not create hazards to health or property and which will not damage or degrade surfaces.
    - a. Use only those cleaning agents, materials and methods recommended by manufacturer of the material to be cleaned.
    - b. Use cleaning materials only on surfaces recommended by cleaning agent manufacturer.
    - c. Before use, review cleaning agents and materials with DSA for suitability and compatibility. Use no cleaning agents and materials without approval as noted above.
  - 2. Cleaning Procedures: All cleaning processes, agents and materials shall be subject to Architect, District and/or DSA review and approval. Processes and degree of cleanliness shall be as directed by Architect, District and/or DSA.
- E. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- F. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- G. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- H. Clean filters of operating equipment.
- I. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- J. Clean site; sweep paved areas, rake clean landscaped surfaces.
- K. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

**3.15 CLOSEOUT PROCEDURES**

- A. Clean-Up Retainage:
  - 1. Five (5) percent of each Contractor's bid will automatically be held in abeyance in their contract schedule of values for clean-up.
  - 2. If in the DSA's opinion the Contractor is maintaining a clean project, a pro-rata share of this clean-up budget will be paid monthly to the Contractor in accordance with their approximate aggregate percentage of completion of the project.
  - 3. If a Contractor fails to heed written directives to clean-up during the course of the project, the work will be done at the Contractor's expense and a deductive change order will be written against their contract with the District.
  - 4. The establishment of this 5 percent budget in no way limits the cost for the Contractor to maintain a clean project.
- B. Make submittals that are required by governing or other authorities.
  - 1. Provide copies to Architect and District.

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- C. Accompany Architect, Construction Manager, and District Representative on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's comprehensive list of items to be completed or corrected.
  - 1. As authorized by the District; Architect and Architect's and District's consultants, as appropriate, will attend a meeting at the Project site to review Contract closeout procedures and to review the list of items to be completed and corrected (punch list) to make the Work ready for acceptance by the District.
  - 2. This meeting shall be scheduled not earlier than 14 days prior to the date anticipated for the Substantial Completion review.
- D. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- E. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
  - 1. Final Application for Payment: In the Application for Payment that coincides with the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed substantially complete.
  - 2. Warranties, Bonds and Certificates: Submit specific warranties, guarantees, workmanship bonds, maintenance agreements, final certifications and similar documents.
  - 3. Locks and Keys: Change temporary lock cylinders over to permanent keying and transmit keys to the District, unless otherwise directed or specified.
  - 4. Tests and Instructions: Complete start-up testing of systems, and instruction of the District's personnel. Remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
- F. Clearing and Cleaning: Prior to the Substantial Completion review, Contractor shall conduct a thorough cleaning and clearing of the Project area, including removal of construction facilities and temporary controls.
- G. Inspection and Testing: Prior to the Substantial Completion review, complete inspection and testing required for the Work, including securing of approvals by authorities having jurisdiction.
  - 1. Complete all inspections, tests, balancing, sterilization and cleaning of plumbing and HVAC systems.
  - 2. Complete inspections and tests of electrical power and signal systems.
  - 3. Complete inspections and tests of conveying (elevator or wheelchair lift) systems.
- H. District will occupy all of the building as specified in Section 01 10 00.
- I. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

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1. Correction (Punch) List: Contractor shall prepare and distribute at the preliminary Contract closeout review meeting, a typewritten, comprehensive list of items to be completed and corrected (punch list) to make the Work ready for acceptance by the District.
  - a. The punch list shall include all items to be completed or corrected prior to the Contractor's application for final payment.
  - b. The punch list shall identify items by location (room number or name) and consecutive number. For example, 307-5 would identify item 5 in Room 307, Roof-4 would identify item 4 on Roof.
  - c. Contractor shall prepare separate lists according to categories used for Drawings. For example, provide lists for Architectural, Structural, Plumbing, Mechanical, Electrical, Fire Protection, Civil, and Landscape.
  - d. Architect, Architect's consultants and District's consultants, if in attendance, will conduct a brief walk-through of Project with the Contractor to review scope and adequacy of the punch list.
  - e. Verbal comments will be made to the Contractor by the DSA, the Architect and the Architect's and District's consultants, if in attendance, during the walk-through. These comments will indicate generally the additions and corrections to be made to the punch list. Such comments shall not be considered to be comprehensive; Contractor shall use the comments as guidance in preparing the punch list for the Substantial Completion review.
  
2. Substantial Completion Meeting: On a date mutually agreed by the District, Architect, and Contractor, a meeting shall be conducted at the Project site to determine whether the Work is satisfactory and complete for filing a Notice of Completion (Substantial Completion).
  - a. Contractor shall provide three working days notice to Architect for requested date of Substantial Completion meeting.
  - b. The DSA, the Architect and the Architect's and District's consultants, as authorized by the District, will attend the Substantial Completion meeting.
  - c. In addition to conducting a walk-through of the facility and reviewing the punch list, the purpose of the meeting shall include submission of warranties, guarantees and bonds to the District, submission of operation and maintenance data (manuals), provision of specified extra materials to the District, and submission of other Contract closeout documents and materials as required and if not already submitted.
  - d. The DSA, the Architect and Architect's consultants, as appropriate, will conduct a walk-through of the facility with the Contractor and review the punch list.
  - e. Contractor shall correct the punch list and record additional items as may identified during the walk-through, including notations of corrective actions to be taken.
  - f. Contractor shall retype the punch list and distribute it within three working days to those attending the meeting.
  - g. If additional site visits by the DSA, the Architect and the Architect's and District's consultants are required to review completion and correction of the Work, the costs

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of additional visits shall be reimbursed to the District by the Contractor by deducting such costs from the Final Payment.

- J. Correct items of work listed in Final Correction Punch List and comply with requirements for access to District-occupied areas.
- K. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
  - 1. Architect's Certification of Substantial Completion:
    - a. When Architect determines that list of items to be completed and corrected (Punch List) is sufficiently complete for District to occupy Project for the use to which it is intended.
    - b. Architect will complete and issue to the District and Contractor a Certificate of Substantial Completion using:
      - 1) The American Institute of Architects Form G704 - Certificate of Substantial Completion
      - 2) or other form if directed by the District.
- L. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

**3.16 FINAL PAYMENT**

- A. After completion of all items listed for completion and correction, after submission of all documents and products and after final cleaning, submit final Application for Payment, identifying total adjusted Contract Sum, previous payments and sum remaining due.
- B. Payment will not be made until the following are accomplished:
  - 1. All Project Record Documents have been transferred and accepted by District.
  - 2. All extra materials and maintenance stock have been transferred and received by District.
  - 3. All warranty documents and operation and maintenance data have been received and accepted by District.
  - 4. All liens have been released or bonded by Contractor.
  - 5. Contractor's surety has consented to Final Payment.
  - 6. All documentation required by DSA has been completed.

**3.17 MAINTENANCE**

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

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- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the District.

**END OF SECTION**

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**SECTION 01 71 23  
FIELD ENGINEERING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Field engineering services by Contractor.

**1.02 DESCRIPTION OF SERVICES**

- A. Specific services listed in this section are in addition to, and do not supersede, general Execution and Closeout Requirements.
- B. Sole responsibility for establishing all locations, dimensions and levels of items of work.
- C. Sole responsibility for provision of all materials required to establish and maintain benchmarks and control points, including batter boards, grade stakes, structure, and pipeline elevation stakes, and other items.
- D. Having a skilled instrument person(s) available on short notice when necessary for laying out the work.
- E. Keeping a transit, theodolite, or TST (total station theodolite with electronic distance measurement device); leveling instrument; and related implements such as survey rods and other measurement devices, at the project site at all times.
- F. Provision of facilities and assistance necessary for Architect to check lines and grade points placed by Contractor.
  - 1. Performance of excavation or embankment work until after all cross-sectioning necessary for determining payment quantities for Unit Price work have been completed and accepted by Architect.
- G. Preparation and maintenance of daily reports of activity on the work. Submission of reports containing key progress indicators and job conditions to Architect.
  - 1. Number of employees at the Site.
  - 2. Number employees at the Site for each of Contractor's subcontractors.
  - 3. Breakdown of employees by trades.
  - 4. Major equipment and materials installed as part of the work.
  - 5. Major construction equipment utilized.
  - 6. Location of areas in which construction was performed.
  - 7. Materials and equipment received.
  - 8. Work performed, including field quality control measures and testing.
  - 9. Weather conditions.
  - 10. Safety.
  - 11. Delays encountered, amount of delay incurred, and the reasons for the delay.
  - 12. Instructions received from Architect or District, if any.

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- H. Preparation and maintenance of professional-quality, accurate, well organized, legible notes of all measurements and calculations made while surveying and laying out the work.
- I. Prior to backfilling operations, surveying - locating, and recording on a copy of Contract Documents - an accurate representation of buried work and Underground Facilities encountered.

**1.03 REFERENCE STANDARDS**

- A. FGDC-STD-007.1 - Geospatial Positioning Accuracy Standards - Part 1: Reporting Methodology.
- B. FGDC-STD-007.2 - Geospatial Positioning Accuracy Standards - Part 2: Standards for Geodetic Networks.
- C. FGDC-STD-007.4 - Geospatial Positioning Accuracy Standards - Part 4: Architecture, Engineering, Construction, and Facilities Measurement.
- D. State Plane Coordinate System for California.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Submit in addition to items required in Section 01 70 00 - Execution and Closeout Requirements.
- C. Informational Submittals: Submit the following:
  - 1. Field Engineering: Submit daily reports, with content as indicated in this section.
    - a. When requested by Architect, submit for Record documentation verifying accuracy of field engineering including, but not limited to, Contractor’s survey notes and field notes.
  - 2. Final property survey.

**1.06 QUALITY ASSURANCE**

- A. Field Engineer's Qualifications: As established in Section 01 70 00 - Execution and Closeout Requirements.
- B. Use adequate number of skilled and thoroughly-trained workers to perform the work of this section in a timely and comprehensive manner.
- C. Minimum accuracy for required work is as follows:
  - 1. Grade: Horizontal Tolerance: Plus or minus 0.5 feet, Vertical Tolerance: Plus or minus 0.05 feet.
  - 2. Culverts and ditches: Horizontal Tolerance: Plus or minus 0.5 feet, Vertical Tolerance: Plus or minus 0.05 feet.
  - 3. Structures: Horizontal Tolerance: Plus or minus 0.5 feet (location), Vertical Tolerance: Plus or minus 0.05 feet.

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**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. Notify District’s Representative and Architect of any discrepancies immediately in writing before proceeding to lay out the work. Locate and protect existing benchmarks and base line. Preserve permanent reference points during construction.
- B. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify existing conditions.

**3.02 FIELD ENGINEERING**

- A. Maintain field office files, drawings, specifications, and record documents.
- B. Coordinate field engineering services with Contractor's subcontractors, installers, and suppliers as appropriate.
- C. Prepare layout and coordination drawings for construction operations.
- D. Check and coordinate the work for conflicts and interferences, and immediately advise Architect and District of all discrepancies of which Contractor is aware.
- E. Cooperate as required with Architect and District in observing the work and performing field inspections.
- F. Review and coordinate work on a regular basis with shop drawings and Contractor's other submittals.
- G. In general, match existing adjacent grades and maintain existing flow lines.
- H. Check the location, line and grade of every major element as the work progresses. Notify the Architect when deviations from required lines or grades exceed allowable tolerances. Include in such notifications a thorough explanation of the problem, and a proposed plan and schedule for remedying the deviation. Do not proceed with remedial work without District’s concurrence of the remediation plan.
- I. Check all formwork, reinforcing, inserts, structural steel, bolts, sleeves, piping, other materials and equipment for compliance with shop drawings and Contract Documents requirements.
- J. Check all bracing and shoring for structural integrity and compliance with designs prepared by the Contractor.

**3.03 LAND SURVEYING**

- A. General: Follow standards for geospatial positioning accuracy.
  - 1. FGDC-STD-007.1 as amended by Authority Having Jurisdiction.
  - 2. FGDC-STD-007.2 as amended by Authority Having Jurisdiction.
  - 3. FGDC-STD-007.4 as amended by Authority Having Jurisdiction.
- B. Coordinate survey data with the State Plane Coordinate System of California.

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- C. Contractor is responsible for the restoration of all property corners and control monuments damaged or destroyed by construction-related activities. Any disturbed monuments must be replaced at Contractor's expense by a surveyor licensed in California, and approved by the Architect.
  - 1. Temporarily suspend work at such points and for such reasonable times as the District may require for resetting monuments. The Contractor will not be entitled to any additional compensation or extension of time.

**3.04 CONSTRUCTION SURVEYING**

- A. General: Perform surveying as applicable to specific items necessary for proper execution of work.
  - 1. Alignment Staking: Provide alignment stakes at 50 foot intervals on tangent, and at 25 foot intervals on curves.
  - 2. Slope Staking: Provide slope staking at 50 foot intervals on tangent, and at 25 foot intervals on curves. Re-stake at every ten-foot difference in elevation.
  - 3. Structure: Stake out structures, including elevations, and check prior to and during construction.
  - 4. Pipelines: Stake out pipelines including elevations, and check prior to and during construction.
  - 5. Site Utilities: Stake out utility lines including elevations, and check prior to and during construction.
  - 6. Road: Stake out roadway elevations at 50 foot intervals on tangent, and at 25 foot intervals on curves.
  - 7. Cross-sections: Provide original, intermediate, and final staking as required, for site work and other locations as necessary for quantity surveys.
  - 8. Easement Staking: Provide easement staking at 50 foot intervals on tangent, and at 25 foot intervals on curves. If required by project conditions, provide wooden laths with flagging at 100 foot intervals.
  - 9. Record Staking: Provide permanent stake at each blind flange and each utility cap is provided for future connections. Use stakes for record staking of material(s) acceptable to Architect.
  - 10. Structural Frame: Upon completion, certify location and plumbness.
- B. Surveying to Determine Quantities for Payment.
  - 1. For each application for progress payment, perform such surveys and computations necessary to determine quantities of work performed or placed. Perform surveys necessary for Architect to determine final quantities of work in place.
  - 2. Notify Architect at least 24 hours before performing survey services for determining quantities. Unless waived in writing by Architect, perform quantity surveys in presence of Architect.
- C. Record Log: Maintain a log of layout control work. Record any 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.

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- D. Use by the Architect: The Architect may at any time use line and grade points and markers established by the Contractor. The Contractor's surveys are a part of the work and may be checked by the Architect at any time.
- E. Accuracy:
  - 1. Establish Contractor's temporary survey references points for Contractor's use to at least second-order accuracy (e.g., 1:10000). Set construction staking used as a guide for the work to at least third-order accuracy (e.g., 1:5000). Provide the absolute margin for error specified below on the basis established by such orders.
    - a. Horizontal accuracy of easement staking: Plus or minus 0.1 feet.
    - b. Accuracy of other staking shall be plus or minus 0.04 feet horizontally and plus or minus 0.02 feet vertically.
    - c. Include an error analysis sufficient to demonstrate required accuracy in survey calculations.
  - 2. District reserves the right to check the Contractor's survey, measurements, and calculations. The requirement for accuracy will not be waived, whether this right is exercised or not.

**3.05 SUPPORT AND BRACING**

- A. General requirements: Design all support and bracing systems, if required. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design systems to not overstress the building structure.
- B. Seismic Bracing: Design where required by authorities having jurisdiction.
  - 1. Design and install all support systems to comply with the seismic requirements of the Construction Code of California.
  - 2. Design and install seismic bracing so as not to defeat the operation on any required vibration isolation or sound isolation devices.

**3.06 REPORTS**

- A. Submit two copies of Contractor's daily reports at Architect's field office (or electronically) by 9:00 AM the next working day after the day covered in the associated report. Daily report shall be signed by responsible member of Contractor's staff, such as project manager or superintendent, or foreman designated by Contractor as having authority to sign daily reports.

**3.07 RECORDS**

- A. Maintain at the Site a complete and accurate log of control and survey work as it progresses.
  - 1. Organize and record survey data in accordance with recognized professional surveying standards, Laws and Regulations, and prevailing standards of practice in California. Record Contractor's surveyor's original field notes, computations, and other surveying data in Contractor-furnished hard-bound field books. Contractor is solely responsible for completeness and accuracy of survey work, and completeness and accuracy of survey records, including field books. Survey records,(including field books) may be rejected by District due to failure to organize and maintain survey records in a manner that allows reasonable and independent verification of calculations, and/or allows identification of elevations, dimensions, and grades of the work.

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2. Illegible notes or data, and erasures on any page of field books, are unacceptable. Do not submit copied notes or data. Corrections by ruling or lining out errors will be unacceptable unless initialed by the surveyor. Violation of these requirements may require re-surveying the data questioned by Architect.
- B. Submit three copies of final property survey to District. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, and levels of the Project are accurately positioned as shown on the survey. Include the following information:
1. Structure locations from property lines, and distances to adjacent buildings.
  2. Dimensions and locations of drives, walks, walls, underground utilities, appurtenances, and major site features.
  3. Location of easements.
  4. Final grading topographic survey.

**3.08 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

**END OF SECTION**

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**SECTION 01 74 19  
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 GENERAL**

**1.01 WASTE MANAGEMENT REQUIREMENTS**

- A. Comply with the requirements Section 5.408 of the California Green Building Standards Code.
  - 1. Recycle and/or salvage for reuse a minimum of 65percent of the nonhazardous construction and demolition waste in accordance with Section 504.8.1.1, 5.408.1.2, or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.
- B. District requires that this project generate the least amount of trash and waste possible.
- C. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- D. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- E. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
  - 1. Aluminum and plastic beverage containers.
  - 2. Corrugated cardboard.
  - 3. Wood pallets.
  - 4. Clean dimensional wood.
  - 5. Concrete: May be crushed and used as riprap, aggregate, sub-base material, or fill.
  - 6. Bricks: May be used on project if whole, or crushed and used as landscape cover, sub-base material, or fill.
  - 7. Concrete masonry units: May be used on project if whole, or crushed and used as sub-base material or fill.
  - 8. Asphalt paving: May be recycled into paving for project.
  - 9. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
  - 10. Glass.
  - 11. Gypsum drywall and plaster.
  - 12. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (<http://flooring.dupont.com>) and Interface ([www.interfaceinc.com](http://www.interfaceinc.com)) conduct reclamation programs.
  - 13. Roofing.
  - 14. Paint.
  - 15. Plastic sheeting.

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16. Rigid foam insulation.
  17. Windows, doors, and door hardware.
  18. Plumbing fixtures.
  19. Mechanical and electrical equipment.
  20. Fluorescent lamps (light bulbs).
  21. Acoustical ceiling tile and panels.
  22. Materials which could be hazardous and subject to special disposal regulations include but are not limited to the following: CalGreen Section 5.408.2
    - a. Lead-Based Paint
    - b. Asbestos: Found in older pipe insulation, asphalt floor tiles, linoleum, insulation, etc.
    - c. Polychlorinated Biphenyls (PCBs):
      - 1) Found in electrical oil filled equipment manufactured prior to 1978 such as transformers, switches and fluorescent lamp ballasts.
      - 2) Also found in adhesive, sealant, caulk, glazing putty, roofing material, pesticide vehicle, ink, paper, fabric dye, gaskets, and hydraulic fluid.
    - d. HVAC Refrigerants: Containing Fluorinated and Chlorinated compounds.
    - e. Drinking Fountain Refrigerants: Containing Fluorinated and Chlorinated compounds.
    - f. Fluorescent Light Tubes: Contain mercury.
    - g. EXIT signs and Smoke Detectors: May contain unregulated, radioactive tritium. · Required to be returned to manufacturer.
    - h. Contaminated Soils.
    - i. Pressure Treated Lumber.
- F. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
1. Contractor's quantitative reports for construction waste materials as a condition of approval of progress payments.
- G. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements. CalGreen Section 5.408.1.1.
- H. The following sources may be useful in developing the Waste Management Plan:
1. California Recycling Department, at [www.bsc.ca.gov/Home/CALGreen.aspx](http://www.bsc.ca.gov/Home/CALGreen.aspx).
  2. General information contacts regarding construction and demolition waste:
    - a. EPA Construction and demolition (C&D) debris website: [www.epa.gov/epawaste/conserves/imr/cdm/](http://www.epa.gov/epawaste/conserves/imr/cdm/).
    - b. Directory of Wood-Framed Building Deconstruction and Reused Building Materials Companies: [www.fpl.fs.fed.us/documnts/fplgtr/fpl\\_gtr150.pdf](http://www.fpl.fs.fed.us/documnts/fplgtr/fpl_gtr150.pdf).
    - c. Additional resources to be developed by Contractor with assistance from District and **Contractor, as requested.**

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3. Recycling Haulers and Markets: The source list below contains local haulers and markets for recyclable materials. This list is provided for information only and is not necessarily comprehensive; other haulers and markets are acceptable.
  - a. CAL-MAX: [www.calrecycle.ca.gov/calmax/](http://www.calrecycle.ca.gov/calmax/).
    - 1) A free service designed to help businesses find markets for non-hazardous materials they have traditionally discarded.
  - b. General Recycling/Reuse Centers: For information on qualified local solid waste haulers contact the California Department of Resources Recycling and Recovery - CalRecycle. The website lists wastes recycling facilities in counties throughout the State of California.
    - 1) <http://www.calrecycle.ca.gov/default.asp>
- I. Methods of trash/waste disposal that are not acceptable are:
  1. Burning on the project site.
  2. Burying on the project site.
  3. Dumping or burying on other property, public or private.
  4. Other illegal dumping or burying.
  5. Incineration, either on- or off-site.
- J. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- C. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- D. Section 01 70 00 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

**1.03 DEFINITIONS**

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
  1. Debris that is not hazardous as defined in CalGreen Section 5.408.2 and California Code of Regulations, Title 22, Section 66261.3 et seq.
  2. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel.

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3. The debris may be commingled with rock, soil, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction or land development projects.
- 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. Diversion: Avoidance of demolition and construction waste sent to landfill or incineration. Diversion does not include using materials for landfill, alternate daily cover on landfills, or materials used as fuel in waste-to-energy processes.
  - E. Enforcement Agency (EA). Enforcement agency as defined in CA Public Resources Code 40130.
  - F. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
  - G. Landfill, Inert waste or Inert Disposal Facility:
    1. A disposal facility that accepts only inert waste such as soil and rock, fully cured asphalt paving, uncontaminated concrete (including fiberglass or steel reinforcing rods embedded in the concrete), brick, glass, and ceramics, for land disposal.
  - H. Landfill, Class III:
    1. A landfill that accepts non-hazardous resources such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations.
    2. A Class III landfill must have a solid waste facilities permit from the California Integrated Waste Management Board (CIWMB) and is regulated by the Enforcement Agency (EA).
  - I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
  - J. Mixed Debris Recycling Facility: A processing facility that accepts loads of commingled construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing the non-recyclable residual materials.
  - K. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
  - L. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
  - M. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
  - N. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
  - O. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
  - P. Recycling Center: A facility that receives only C&D material that has been separated for reuse prior to receipt, in which the residual (disposed) amount of waste in the material is less than 10% of the amount separated for reuse by weight.
  - Q. Return: To give back reusable items or unused products to vendors for credit.

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- R. Reuse: To reuse a construction waste material in some manner on the project site.
- S. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- T. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- U. Separated for Reuse:
  - 1. Materials, including commingled recyclables.
  - 2. Separated or kept separate from the solid waste stream for the purpose of:
    - a. Additional sorting or processing those materials for reuse or recycling.
      - 1) In order to return them to the economic mainstream in the form of raw material for new, reused, or reconstituted products.
    - b. Products shall meet the quality standards necessary to be used in the marketplace.
    - c. Includes materials that have been "source separated".
- V. Solid Waste:
  - 1. All putrescible and nonputrescible solid, semisolid, and liquid wastes, including:
    - a. Garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes.
    - b. Abandoned vehicles and parts thereof.
    - c. Discarded home and industrial appliances.
    - d. Dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste.
    - e. Manure, vegetable or animal solid and semisolid wastes.
    - f. Other discarded solid and semisolid wastes.
  - 2. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by State law.
- W. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
  - 1. Materials, including commingled recyclables, that have been separated or kept separate from the solid waste stream at the point of generation, for the purpose of additional sorting or processing of those materials for reuse or recycling in order to return them to the economic mainstream in the form of raw materials for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace.
- X. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- Y. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- Z. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- AA. Waste Hauler: A company that possesses a valid permit from the local waste management authority to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal in the locality.

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#### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Submit Waste Management Plan within 30 calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.
  - 1. Submit four copies of CWMP for review.
    - a. Contractor's Construction Waste and Recycling Plan must be approved by the Architect and Construction Manager prior to the start of Work.
  - 2. Approval of the Contractor's CWMP shall not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.
- C. Waste Management Plan: Include the following information:
  - 1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
  - 2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
  - 3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
    - a. List each material proposed to be salvaged, reused, or recycled.
    - b. List the local market for each material.
  - 4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
  - 5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
  - 6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
  - 7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.
- D. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
  - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
    - a. Inert materials shall achieve a construction waste diversion rate of at least 95 percent.
      - 1) These materials include, but are not limited to, concrete, asphalt and rock.
      - 2) Earthwork is not included.

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- 3) Excavated soil shall not be included in any of the calculations used to ensure compliance with this specification section.
  - b. The overall diversion rate must be based on weight.
  - c. The diversion rate of individual materials can be measured in either weight or volume, but the rate shall be converted into the units selected for calculating the overall diversion rate.
    - 1) All individual material diversions must be converted to a consistent set of units when calculating the overall diversion rate for the all reports and submittals required for the Work.
  - d. Conversion rate numbers shall be based on standard conversion rate data for construction projects provided by the California Integrated Waste Management Board (CIWMB). This data is available at the following internet location, <http://www.calrecycle.ca.gov/LGCentral/Library/dsg/ICandD.htm>.
2. Submit Report on a form acceptable to District.
  3. Landfill Disposal: Include the following information:
    - a. Identification of material.
    - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
    - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
    - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
  4. Recycled and Salvaged Materials: Include the following information for each:
    - a. Identification of material, including those retrieved by installer for use on other projects.
    - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
    - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
    - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
    - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
  5. Material Reused on Project: Include the following information for each:
    - a. Identification of material and how it was used in the project.
    - b. Amount, in tons or cubic yards.
    - c. Include weight tickets as evidence of quantity.
  6. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

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**PART 2 PRODUCTS**

**2.01 PRODUCT SUBSTITUTIONS**

- A. See Section 01 60 00 - Product Requirements for substitution submission procedures.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 60 00:
  - 1. Relative amount of waste produced, compared to specified product.
  - 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
  - 3. Proposed disposal method for waste product.
  - 4. Markets for recycled waste product.

**PART 3 EXECUTION**

**3.01 WASTE MANAGEMENT PROCEDURES**

- A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

**3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION**

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, District, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
  - 1. Prebid meeting.
  - 2. Preconstruction meeting.
  - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
  - 1. As a minimum, provide:

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- a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
  - b. Separate dumpsters for each category of recyclable.
  - c. Recycling bins at worker lunch area.
2. Provide containers as required.
  3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
  4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
  5. Locate enclosures out of the way of construction traffic.
  6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
  7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
  8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
  - G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
  - H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
  - I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

**3.03 DISPOSAL OPERATIONS AND WASTE HAULING**

- A. Remove waste materials from Project Site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  1. Except for items or materials to be salvaged, recycled, or otherwise reused.
  2. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on site.
  3. Use a permitted waste hauler or Contractor's trucking services and personnel. To confirm valid permitted status of waste haulers, contact the local solid waste authority.
  4. Become familiar with the conditions for acceptance of new construction, excavation and demolition materials at recycling facilities, prior to delivering materials.
  5. Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.
  6. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  7. Do not burn or bury waste materials on or off site. Appropriate on-site topical application of ground gypsum or wood, or use of site paving as granulated fill is considered reuse,

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not waste.

**3.04 PLAN AND REPORT FORMS**

A. See suggested forms on the following pages.

**END OF SECTION**

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## CONTRACTOR'S CONSTRUCTION WASTE AND RECYCLING PLAN

(Submit After Award of Contract and Prior to Start of Work)

Project Title:						
Contract or Work Order No.:						
Contractor's Name:						
Street Address:						
City:			State:		Zip:	
Phone: ( )			Fax: ( )			
E-Mail Address:						
Prepared by: (Print Name)						
Date Submitted:						
Project Period: From: TO:						
Reuse, Recycling or Disposal Processes To Be Used						
Describe the types of recycling processes or disposal activities that will be used for material generated in the project. Indicate the type of process or activity by number, types of materials, and estimated quantities that will be recycled or disposed in the sections below:						
01 - Reuse of building materials or salvage items on site (i.e. crushed base or red clay brick)						
02 - Salvaging building materials or salvage items at an offsite salvage or re-use center (i.e. lighting, fixtures)						
03 - Recycling source separated materials on site (i.e. crushing asphalt/concrete for reuse or grinding for mulch)						
04 - Recycling source separated materials at an offsite recycling center (i.e. scrap metal or green materials)						
05 - Recycling commingled loads of C&D materials at an offsite mixed debris recycling center or transfer station						
06 - Recycling material as Alternative Daily Cover at landfills						
07 - Delivery of soils or mixed inerts to an inert landfill for disposal (inert fill).						
08 - Disposal at a landfill or transfer station.						
09 - Other (please describe) _____						
Types of Material To Be Generated						
Use these codes to indicate the types of material that will be generated on the project						
A = Asphalt      C = Concrete      M = Metals      I = Mixed Inert      G = Green Materials						
D = Drywall      P/C=Paper/Cardboard      W/C = Wire/Cable      S= Soils (Non Hazardous)						
M/C = Miscellaneous Construction Debris      R = Reuse/Salvage      W = Wood      O = Other (describe)						
Facilities Used: Provide Name of Facility and Location (City)						
Total Truck Loads: Provide Number of Trucks Hauled from Site During Reporting Period						
Total Quantities: If scales are available at sites, report in tons. If not, quantify by cubic yards. For salvage/reuse items, quantify by estimated weight (or units).						
SECTION I - RE-USED/RECYCLED MATERIALS						
Include all recycling activities for source separated or mixed material recycling centers where recycling will occur.						
Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities		
				Tons	Cubic YD	Other Wt.
(ex.) M	04	ABC Metals, Los Angeles	24	355		
a. Total Diversion						

**CONTRACTOR'S CONSTRUCTION WASTE AND RECYCLING PLAN**

Continued

SECTION II - DISPOSED MATERIALS						
Include all disposal activities for landfills, transfer stations, or inert landfills where no recycling will occur.						
Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities		
				Tons	Cubic YD	Other Wt.
(ex.) D	08	DEF Landfill, Los Angeles	2	35		
<b>b. Total Disposal</b>				<b>0</b>	<b>0</b>	<b>0</b>

SECTION III - TOTAL MATERIALS GENERATED			
This section calculates the total materials to be generated during the project period (Reuse/Recycle + Disposal = Generation)			
	Tons	Cubic YD	Other Wt.
<b>a. Total Reused/Recycled</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>b. Total Disposed</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>c. Total Generated</b>	<b>0</b>	<b>0</b>	<b>0</b>

SECTION IV - CONTRACTOR'S LANDFILL DIVERSION RATE CALCULATION			
Add totals from Section I + Section II			
	Tons	Cubic YD	Other Wt.
<b>a. Materials Re-Used and Recycled</b>	<b>0</b>		
<b>b. Materials Disposed</b>	<b>0</b>		
<b>c. Total Materials Generated (a. + b. = c.)</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>d. Landfill Diversion Rate (Tonnage Only)*</b>			

\* Use tons only to calculate recycling percentages: Tons Reused/Recycled/Tons Generated = % Recycled

Contractor's Comments (Provide any additional information pertinent to planned reuse, recycling, or disposal activities):

- Notes:
- |  |  |
|--|--|
| 1. Suggested Conversion Factors: From Cubic Yards to Tons<br>(Use when scales are not available) | c. Ferrous Metals: .22 (ex. 1000 CY Ferrous Metal = 220 tons)          |
| a. Asphalt: .61 (ex. 1000 CY Asphalt = 610 tons. Applies to broken chunks of asphalt)            | d. Non-Ferrous Metals: .10 (ex. 1000 CY Non-Ferrous Metals = 100 tons) |
| b. Concrete: .93 (ex. 1000 CY Concrete = 930 tons. Applies to broken chunks of concrete)         | e. Drywall Scrap: .20  |
|  | f. Wood Scrap: .16   |



## CONTRACTOR'S REUSE, RECYCLING, AND DISPOSAL REPORT

(Submit With Each Progress Payment)

Project Title:						
Contract or Work Order No.:						
Contractor's Name:						
Street Address:						
City:			State:		Zip:	
Phone: ( )			Fax: ( )			
E-Mail Address:						
Prepared by: (Print Name)						
Date Submitted:						
Project Period:			From:		TO:	
Reuse, Recycling or Disposal Processes to Be Used						
Describe the types of recycling processes or disposal activities that will be used for material generated in the project. Indicate the type of process or activity by number, types of materials, and estimated quantities that will be recycled or disposed in the sections below:						
01 - Reuse of building materials or salvage items on site (i.e. crushed base or red clay brick)						
02 - Salvaging building materials or salvage items at an offsite salvage or re-use center (i.e. lighting, fixtures)						
03 - Recycling source separated materials on site (i.e. crushing asphalt/concrete for reuse or grinding for mulch)						
04 - Recycling source separated materials at an offsite recycling center (i.e. scrap metal or green materials)						
05 - Recycling commingled loads of C&D materials at an offsite mixed debris recycling center or transfer station						
06 - Recycling material as Alternative Daily Cover at landfills						
07 - Delivery of soils or mixed inerts to an inert landfill for disposal (inert fill).						
08 - Disposal at a landfill or transfer station.						
09 - Other (please describe) _____						
Types of Material To Be Generated						
Use these codes to indicate the types of material that will be generated on the project						
A = Asphalt		C = Concrete		M = Metals		I = Mixed Inert
D = Drywall		P/C=Paper/Cardboard		W/C = Wire/Cable		S= Soils (Non-Hazardous)
M/C = Miscellaneous Construction Debris		R = Reuse/Salvage		W = Wood		O = Other (describe)
Facilities Used: Provide Name of Facility and Location (City)						
Total Truck Loads: Provide Number of Trucks Hauled from Site During Reporting Period						
Total Quantities: If scales are available at sites, report in tons. If not, quantify by cubic yards. For salvage/reuse items, quantify by estimated weight (or units).						
SECTION I - RE-USED/RECYCLED MATERIALS						
Include all recycling activities for source separated or mixed material recycling centers where recycling will occur.						
Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities		
				Tons	Cubic YD	Other Wt.
(ex.) M	04	ABC Metals, Los Angeles	24	355		
a. Total Diversion						

**CONTRACTOR'S REUSE, RECYCLING, AND DISPOSAL REPORT**

Continued

SECTION II - DISPOSED MATERIALS						
Include all disposal activities for landfills, transfer stations, or inert landfills where no recycling will occur.						
Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities		
				Tons	Cubic YD	Other Wt.
(ex.) D	08	DEF Landfill, Los Angeles	2	35		
b. Total Disposal						

SECTION III - TOTAL MATERIALS GENERATED			
This section calculates the total materials to be generated during the project period (Reuse/Recycle + Disposal = Generation)			
	Tons	Cubic YD	Other Wt.
a. Total Reused/Recycled			
b. Total Disposed			
c. Total Generated			

SECTION IV - CONTRACTOR'S LANDFILL DIVERSION RATE CALCULATION			
Add totals from Section I + Section II			
	Tons	Cubic YD	Other Wt.
a. Materials Re-Used and Recycled			
b. Materials Disposed			
c. Total Materials Generated (a. + b. = c.)			
d. Landfill Diversion Rate (Tonnage Only)*			

\* Use tons only to calculate recycling percentages: Tons Reused/Recycled/Tons Generated = % Recycled

Contractor's Comments (Provide any additional information pertinent to planned reuse, recycling, or disposal activities):

- Notes:
- |  |  |
|--|--|
| 1. Suggested Conversion Factors: From Cubic Yards to Tons<br>(Use when scales are not available) | c. Ferrous Metals: .22 (ex. 1000 CY Ferrous Metal = 220 tons)          |
| a. Asphalt: .61 (ex. 1000 CY Asphalt = 610 tons. Applies to broken chunks of asphalt)            | d. Non-Ferrous Metals: .10 (ex. 1000 CY Non-Ferrous Metals = 100 tons) |
| b. Concrete: .93 (ex. 1000 CY Concrete = 930 tons. Applies to broken chunks of concrete)         | e. Drywall Scrap: .20  |
|  | f. Wood Scrap: .16   |

**SECTION 01 78 00  
CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section District issued Bidding Instructions and General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 45 33 - Code Required Special Inspections & Procedures: Construction oversight procedures by DSA regarding the execution, approval, and closeout of this building project.
- D. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- E. Individual Product Sections: Specific requirements for operation and maintenance data.
- F. Individual Product Sections: Warranties required for specific products or Work.
  - 1. Special Project warranty requirements for specific products or elements of the Work; commitments and agreements for continuing services to District.

**1.03 DEFINITIONS**

- A. Warranty: Assurance to District by Contractor, installer, supplier, manufacturer or other party responsible as warrantor, for the quantity, quality, performance and other representations of a product, system service of the Work, in whole or in part, for the duration of the specified period of time.
- B. Guarantee: Assurance to District by Contractor or product manufacturer or other specified party, as guarantor, that the specified warranty will be fulfilled by the guarantor in the event of default by the warrantor.
- C. Standard Product Warranty: Preprinted, written warranty published by product manufacturer for particular products and specifically endorsed by the manufacturer to the District.
- D. Special Project Warranty: Written warranty required by or incorporated into Contract Documents, to extend time limits provided by standard warranty or to provide greater rights for District.
- E. Correction Period: As defined in the Conditions of the Contract, Correction Period shall be synonymous with "warranty period", "guarantee period" and similar terms used in the Contract Specifications.

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#### 1.04 SUBMITTALS

- A. Advance Submittals: For equipment and systems, or component parts of systems, put into service during construction and operated by District, submit documents within ten days of start of operation by District.
- B. Final Completion Submittals: Prior to application for final payment, Contractor shall submit 3 copies the following:
  - 1. Agency Document Submittals: Submit to District all documents required by authorities having jurisdiction, including serving utilities and other agencies. Submit original versions of all permit cards, with final sign-off by inspectors. Submit all certifications of inspections and tests.
    - a. Contractor shall also complete all required contractor forms and obtain DSA approval of these same forms. Comply with "Final Certification of Construction" per Title 24 Part 1 section 4-339.
      - 1) Form-6.C: Verified Report – Contractor: From each Contractor having a contract with the District.
  - 2. Final Specifications Submittals: Submit to District all documents and products required by Specifications to be submitted, including the following:
    - a. Project record drawings and specifications.
    - b. Operating and maintenance data.
    - c. Guarantees, warranties and bonds.
    - d. Keys and keying schedule.
    - e. Spare parts and extra stock.
    - f. Test reports and certificates of compliance.
  - 3. Certificates of Compliance and Test Report Submittals: Submit to District certificates and reports as specified and as required by authorities having jurisdiction, including the following:
    - a. Sterilization of water systems.
    - b. Sanitary sewer system tests.
    - c. Gas system tests.
    - d. Lighting, power and signal system tests.
    - e. Ventilation equipment and air balance tests.
    - f. Fire sprinkler system tests.
    - g. Fire detection system, smoke alarms and dampers.
    - h. Roofing inspections and tests.
  - 4. Lien and Bonding Company Releases: Submit to District, with copy to Architect, evidence of satisfaction of encumbrances on Project by completion and submission of The American Institute of Architects Forms:
    - a. G706 - Contractor's Affidavit of Payment of Debts and Claims;
    - b. G706A - Contractor's Affidavit of Release of Liens;
    - c. (if applicable) G707 - Consent of Surety;
    - d. or forms as as agreed to by the District.

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- e. Comply also with other requirements of District, as directed.
  - f. All signatures shall be notarized.
5. Subcontractor List: Submit to two copies to District and two copies to Architect of updated Subcontractor and Materials Supplier List.
  6. Warranty Documents: Prepare and submit to District all warranties and bonds as specified in Contract General Conditions and this Section.
- C. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- D. Operation and Maintenance Data:
1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
  2. For equipment, or component parts of equipment put into service during construction and operated by District, submit completed documents within ten days after acceptance.
  3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
  4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- E. Warranties and Bonds:
1. For equipment or component parts of equipment put into service during construction with District's permission, submit documents within 10 days after acceptance.
  2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**1.05 WARRANTIES AND GUARANTEES**

- A. General:
1. Provide all warranties and guarantees with District named as beneficiary.
  2. For equipment and products, or components thereof, bearing a manufacturer's warranty or guarantee that extends for a period of time beyond the Contractor's warranty and guarantee, so state in the warranty or guarantee.
- B. Provisions for Special Warranties: Refer to Conditions of the Contract for terms of the Contractor's special warranty of workmanship and materials.
- C. General Warranty and Guarantee Requirements:
1. Warranty shall be an agreement to repair or replace, without cost and undue hardship to District, Work performed under the Contract which is found to be defective during the Correction Period (warranty or guarantee) period.
  2. Repairs and replacements due to improper maintenance or operation, or due to normal wear, usage and weathering are excluded from warranty requirements unless otherwise

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specified.

- D. Specific Warranty and Guarantee Requirements: Specific requirements are included in product Specifications Sections of Divisions 3 through 33, including content and limitations.
- E. Disclaimers and Limitations:
  - 1. Manufacturer's disclaimers and limitations on product warranties and guarantees shall not relieve Contractor of responsibility for warranty and guarantee requirements.
  - 2. This applies to the Work that incorporates such products, nor shall they relieve suppliers, manufacturers, and installers required to countersign special warranties with Contractor.
- F. Related Damages and Losses: When correcting warranted Work that has been found defective, remove and replace other Work that has been damaged as a result of such defect or that must be removed and replaced to provide access for correction of warranted Work.
- G. Reinstatement of Warranty:
  - 1. When Work covered by a warranty has been found defective and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.
  - 2. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- H. Replacement Cost:
  - 1. Upon determination that Work covered by a warranty has been found to be defective, replace or reconstruct the Work to a condition acceptable to District, complying with applicable requirements of the Contract Documents.
  - 2. Contractor shall be responsible for all costs for replacing or reconstructing defective Work regardless of whether District has benefited from use of the Work through a portion of its anticipated useful service life.
- I. District's Recourse:
  - 1. Written warranties made to the District shall be in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under law, nor shall warranty periods be interpreted as limitations on time in which the District can enforce such other duties, obligations, rights, or remedies.
  - 2. Rejection of Warranties:
    - a. The District reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- J. Warranty as Condition of Acceptance:
  - 1. District reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment shall be required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

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**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Record Documents are to be maintained and submitted in searchable live electronic format (PDF).
  - 1. Develop in compliance with Section 01 30 00 - Administrative Requirements.
  - 2. Acceptable markup software:
    - a. Adobe Acrobat Professional.
    - b. Bluebeam Revu.
- B. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Contract Drawings.
  - 2. Project Manual with Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the Contract.
  - 5. Reviewed shop drawings, product data, and samples.
  - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- C. Ensure entries are complete and accurate, enabling future reference by District.
- D. Store record documents separate from documents used for construction.
- E. Record information concurrent with construction progress.
- F. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Product substitutions or alternates utilized.
  - 3. Changes made by Addenda and modifications.
  - 4. Provide copies of all approved addenda, directives, corrections, and change orders affecting the associated project.
    - a. These copies shall be included with the "Bid Set" and/or "Record Set" listed above and formatted as detailed above.
- G. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  - 1. Reproducible set of Contract Drawings will be provided to Contractor by District through Architect or DSA.
  - 2. Measured depths of foundations in relation to finish first floor datum.
  - 3. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

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4. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  5. Field changes of dimension and detail.
  6. Details not on original Contract drawings.
    - a. Application of copies of details produced and provided by Architect during construction will be accepted.
- H. Submission: Submit Record Documents in searchable (live text and redlines mark-ups; not scanned) PDF format to Architect prior to final Application for Payment.
1. Maintain one additional paper copy and one in PDF format (on CD) of the fire suppression and fire protection detection system drawings and specifications at the building premises.
    - a. One copy is to be kept on site for a period of three years to comply with CFC section 901.6.2.

**3.02 OPERATION AND MAINTENANCE DATA**

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

**3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
  1. Product data, with catalog number, size, composition, and color and texture designations.
  2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

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### 3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
  - 1. Parts Data:
    - a. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams as necessary for service and maintenance.
    - b. Include complete nomenclature and catalog numbers for consumable and replacement parts.
    - c. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in stock by the District or operator.
- O. Include test and balancing reports.
- P. Additional Requirements: As specified in individual product specification sections.

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**3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for District's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
  - 1. Provide duplicate electronic formatted (PDF) versions of the O&M binder for record purposes. Organize the same as the printed versions.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
  - 1. Project Directory.
  - 2. Table of Contents, of all volumes, and of this volume.
  - 3. Operation and Maintenance Data: Arranged by system, then by product category.
    - a. Source data.
    - b. Product data, shop drawings, and other submittals.
    - c. Operation and maintenance data.
    - d. Field quality control data.
    - e. Photocopies of warranties and bonds.
  - 4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

**3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with District's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

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- B. Project Warranty and Guarantee Forms:
  1. Example forms for special Project warranties and guarantees are included at the end of this Section.
  2. Prepare written documents utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer.
    - a. Submit a draft to District through Architect for approval prior to final execution.
  3. Refer to product Specifications Sections of Divisions 2 through 33 for specific content requirements, and particular requirements for submittal of special warranties.
  4. Prepare standard warranties and guarantees, excepting manufacturers' standard printed warranties and guarantees, on Contractor's, subcontractor's, material supplier's, or manufacturer's own letterhead, addressed to District.
  5. Warranty and guarantee letters shall be signed by all responsible parties and by Contractor in every case, with modifications only as approved in advance by District to suit the conditions pertaining to the warranty or guarantee.
- C. Manufacturer's Guarantee Form:
  1. Manufacturer's guarantee form may be used in lieu of special Project form included at the end of this Section.
  2. Manufacturer's guarantee form shall contain appropriate terms and identification, ready for execution by the required parties.
  3. If proposed terms and conditions restrict guarantee coverage or require actions by District beyond those specified, submit draft of guarantee to District through Architect for review and acceptance before performance of the Work.
  4. In other cases, submit draft of guarantee to District through Architect for approval prior to final execution of guarantee.
- D. Signatures: Signatures shall be by person authorized to sign warranties, guarantees and bonds on behalf of entity providing such warranty, guarantee or bond.
- E. Co-Signature: All installer's warranties and bonds shall be co-signed by Contractor. Manufacturer's guarantees will not require co-signature.
- F. Verify that documents are in proper form, contain full information, and are notarized.
- G. Co-execute submittals when required.
- H. Retain warranties and bonds until time specified for submittal.
- I. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- J. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
  1. If more than one volume of warranties, guarantees and bonds is produced, identify volume number on binder.
- K. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

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- L. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- M. Form of Warranty and Bond Submittals:
  - 1. Prior to final Application and Certificate for Payment, compile two copies of each required warranty, guarantee and bond, properly executed by Contractor, or jointly by Contractor, subcontractor, supplier, or manufacturer.
  - 2. Collect and assemble all written warranties and guarantees into binders and deliver binders to District for final review and acceptance.
  - 3. Include Table of Contents for binder, neatly typed, following order and Section numbers and titles as used in the Project Manual.
  - 4. Provide heavy paper dividers with celluloid or plastic covered tabs for each separate warranty.
    - a. Mark tabs to identify products or installation, and Section number and title.
  - 5. Include on separate typed sheet, if information is not contained in warranty or guarantee form, a description of the product or installation, and the name, address, telephone number and responsible person for applicable installer, supplier and manufacturer.
  - 6. When operating and maintenance data manuals are required for warranted construction, include additional copies of each required warranty and guarantee in each required manual.
    - a. Coordinate with requirements listed in the prior articles for operating and maintenance data manuals.

**3.07 TIME OF WARRANTY AND BOND SUBMITTALS**

- A. Submission of Preliminary Copies:
  - 1. Unless otherwise specified, obtain preliminary copies of warranties, guarantees and bonds within ten days of completion of applicable item or Work.
  - 2. Prepare and submit preliminary copies for review as specified herein.
- B. Submission of Final Copies:
  - 1. Submit fully executed copies of warranties, guarantees and bonds within ten days of date identified in Certificate of Completion but no later than three days prior to date of final Application for Payment.
- C. Date of Warranties and Bonds:
  - 1. Unless otherwise directed or specified, commencement date of warranty, guarantee and bond periods shall be the date established in the Certificate of Completion.
  - 2. Warranties for Work accepted in advance of date stated in Certificate of Completion:
    - a. When a designated system, equipment, component parts or other portion of the Work is completed and occupied or put to beneficial use by District:
      - 1) By separate agreement with Contractor, prior to completion date established in the Certificate of Completion, submit properly executed warranties to District within ten days of completion of that designated portion of the Work.

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- 2) List date of commencement of warranty, guarantee or bond period as the date established in the Certificate of Completion.
- 3. Warranties for Work not accepted as of date established in the Certificate of Completion:
  - a. Submit documents within ten days after acceptance, listing date of acceptance as beginning of warranty, guarantee or bond period.
- D. Duration of Warranties and Guarantees:
  - 1. Unless otherwise specified or prescribed by law, warranty and guarantee periods shall be not less than the Correction Period required by the Conditions of the Contract.
  - 2. In no case, the period is to be less than one year from the date established for completion of the Project in the Certificate of Completion.
  - 3. See product Specifications Sections of the Project Manual for extended warranty and guarantee beyond the minimum one year duration.

**END OF SECTION**

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**SECTION 01 78 00.01  
WARRANTY FORM LETTER**

**FOR CONTRACTOR'S / SUBCONTRACTOR'S / MANUFACTURER'S WARRANTY**

CONTRACTOR'S/SUBCONTRACTOR'S/SUPPLIER'S LETTERHEAD

**SPECIAL LIMITED PROJECT WARRANTY FOR \_\_\_\_\_ WORK.**

We, the undersigned, do hereby warrant that the portion of the Work described above which we have provided for Swimming Pool Refurbishment is in accordance with the Contract Documents and that all such Work as installed will fulfill or exceed all minimum warranty requirements.

We agree to repair or replace Work installed by us, together with any adjacent Work which is displaced or damaged by so doing, that proves to be defective in workmanship, material, or function within a period of (years), commencing (date identified in Certificate of Completion, unless otherwise directed) and terminating (date).

The following terms and conditions apply to this warranty (obtain District 's approval before submission):

In the event of our failure to comply with the above-mentioned conditions within a reasonable time period determined by the District , after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the District to have said defective Work repaired or replaced to be made good, and agree to pay to the District upon demand all moneys that the District may expend in making good said defective Work, including all collection costs and reasonable attorney fees.

**LOCAL REPRESENTATIVE: FOR WARRANTY MAINTENANCE, REPAIR, OR REPLACEMENT SERVICE, CONTACT:**

(Name) \_\_\_\_\_  
(Address) \_\_\_\_\_  
(City) \_\_\_\_\_ (State) \_\_\_\_\_ (ZIP) \_\_\_\_\_  
(Phone) \_\_\_\_\_ / \_\_\_\_\_  
(signed) \_\_\_\_\_  
(Date) \_\_\_\_\_ (Typed Name) \_\_\_\_\_  
(Title) \_\_\_\_\_ (Firm) \_\_\_\_\_

**CONTRACTOR:**

State License No: \_\_\_\_\_  
(signed) \_\_\_\_\_  
(Date) \_\_\_\_\_ (Typed Name) \_\_\_\_\_  
(Title) \_\_\_\_\_ (Firm) \_\_\_\_\_

**FORM LETTER**

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**FORM LETTER**

**FOR CONTRACTOR'S / MANUFACTURER'S GUARANTEE**

CONTRACTOR'S / MANUFACTURER'S LETTERHEAD

**SPECIAL LIMITED PROJECT [\_\_WARRANTY\_\_] [\_\_GUARANTEE\_\_] FOR \_\_\_\_\_ WORK.**

We, the undersigned, do hereby [\_\_warranty\_\_] [\_\_guarantee\_\_] that the portion of the Work described above which [\_\_we have provided\_\_] [\_\_was provided by (Installer or Subcontractor's Name)\_\_] for Swimming Pool Refurbishment in accordance with the Contract Documents and that all such Work as installed will fulfill or exceed all minimum warranty requirements. We agree to repair or replace Work installed by [\_\_us,\_\_] [\_\_(Installer or Subcontractor's Name)\_\_] together with any adjacent Work which is displaced or damaged by so doing, that proves to be defective in workmanship, material, or function within a period of (years), commencing (date indicated in Certificate of Completion, unless otherwise directed) and terminating (date).

The following terms and conditions apply to this [\_\_warranty\_\_] [\_\_guarantee\_\_] (obtain District's approval before submission):

In the event of our failure to comply with the above-mentioned conditions within a reasonable time period determined by the District, after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the District to have said defective Work repaired or replaced to be made good, and agree to pay to the District upon demand all moneys that the District may expend in making good said defective Work, including all collection costs and reasonable attorney fees.

**LOCAL REPRESENTATIVE: FOR WARRANTY MAINTENANCE, REPAIR, OR REPLACEMENT SERVICE, CONTACT:**

(Name) \_\_\_\_\_  
(Address) \_\_\_\_\_  
(City) \_\_\_\_\_ (State) \_\_\_\_\_ (ZIP) \_\_\_\_\_  
(Phone) \_\_\_\_\_ / \_\_\_\_\_  
(signed) \_\_\_\_\_  
(Date) \_\_\_\_\_ (Typed Name) \_\_\_\_\_  
(Title) \_\_\_\_\_ (Firm) \_\_\_\_\_

**CONTRACTOR:**

State License No: \_\_\_\_\_  
(signed) \_\_\_\_\_  
(Date) \_\_\_\_\_ (Typed Name) \_\_\_\_\_  
(Title) \_\_\_\_\_ (Firm) \_\_\_\_\_

**FORM LETTER**

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**END OF SECTION**

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**SECTION 01 79 00  
DEMONSTRATION AND TRAINING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.
- B. Training of District personnel in operation and maintenance is required for:
  - 1. All software-operated systems.
  - 2. HVAC systems and equipment.
  - 3. Plumbing equipment.
  - 4. Electrical systems and equipment.
  - 5. Conveying systems.
  - 6. Landscape irrigation.
  - 7. Items specified in individual product Sections.
- C. Training of District personnel in care, cleaning, maintenance, and repair is required for:
  - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
  - 2. Finishes, including flooring, wall finishes, ceiling finishes.
  - 3. Fixtures and fittings.
  - 4. Items specified in individual product Sections.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 91 13 - General Commissioning Requirements: Additional requirements applicable to demonstration and training.
- B. Other Specification Sections: Additional requirements for demonstration and training.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Training Plan: District will designate personnel to be trained; tailor training to needs and skill-level of attendees.
  - 1. Each Sub, Design-Builder SubContractor and vendor responsible for training submits a written training plan to the Architect and District Representative for review and approval prior to training.
  - 2. Submit to Architect for transmittal to District.
  - 3. Submit not less than four weeks prior to start of training.
  - 4. Revise and resubmit until acceptable.
  - 5. Provide an overall schedule showing all training sessions.
  - 6. Include at least the following for each training session:

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- a. Identification, date, time, and duration.
  - b. Description of products and/or systems to be covered.
    - 1) Equipment list
  - c. Name of firm and person conducting training; include qualifications.
  - d. Intended audience, such as job description.
  - e. Objectives of training and suggested methods of ensuring adequate training.
    - 1) Agenda and subjects (design intent, equipment inspections, modes of operation, system interactions, troubleshooting, preventative maintenance, etc.)
  - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
  - g. Media to be used, such a slides, hand-outs, etc.
    - 1) The approved O&M manuals shall be used during the training for equipment specific references.
  - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
- 1. Include applicable portion of O&M manuals.
  - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
  - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:
- 1. Identification of each training session, date, time, and duration.
  - 2. Sign-in sheet showing names and job titles of attendees.
  - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
  - 4. Include Commissioning Authority's formal acceptance of training session.
- E. Video Recordings: Submit digital video recording of each demonstration and training session for District's subsequent use.
- 1. Format: DVD Disc.
  - 2. Label each disc and container with session identification and date.

**1.04 QUALITY ASSURANCE**

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
- 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.

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2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 TRAINING OF OWNER PERSONNEL**

- A. The Contractor and Design-Builder SubContractors shall be responsible for training coordination and scheduling and for ensuring that training is completed.
- B. The Commissioning Authority (CA) shall be responsible for reviewing and approving the content of the training of Owner personnel for commissioned equipment.
- C. The specific training requirements of District personnel by Subs, Design-Builder SubContractors and vendors is specified in the Division in which the equipment is specified.
- D. For primary HVAC equipment, the Controls Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others.

**3.02 DEMONSTRATION - GENERAL**

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by District.
- B. Demonstrations conducted during Functional Testing need not be repeated unless District personnel training is specified.
- C. Demonstration may be combined with District personnel training if applicable.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
  1. Perform demonstrations not less than two weeks prior to Substantial Completion.
  2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
  1. Perform demonstrations not less than two weeks prior to Substantial Completion.

**3.03 TRAINING - GENERAL**

- A. Commissioning Authority will prepare the Training Plan based on draft plans submitted.
- B. Conduct training on-site unless otherwise indicated.
- C. District will provide classroom and seating at no cost to Contractor.
- D. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.
- E. Provide training in minimum two hour segments.
- F. The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.

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- G. Training schedule will be subject to availability of District's personnel to be trained; re-schedule training sessions as required by District; once schedule has been approved by District failure to conduct sessions according to schedule will be cause for District to charge Contractor for personnel "show-up" time.
- H. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
  - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  - 3. Typical uses of the O&M manuals.
- I. Product- and System-Specific Training:
  - 1. Review the applicable O&M manuals.
  - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
  - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
  - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
  - 6. Discuss common troubleshooting problems and solutions.
  - 7. Discuss any peculiarities of equipment installation or operation.
  - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
  - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
  - 10. Review spare parts and tools required to be furnished by Contractor.
  - 11. Review spare parts suppliers and sources and procurement procedures.
- J. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**

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**SECTION 02 41 00  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of built site elements.
  - 1. Demolition and removal of existing site improvements within Project area, as indicated on Drawings and as necessary to accomplish the Work, including:
    - a. Asphaltic concrete and portland cement concrete paving.
    - b. Pavement cutting and removal.
    - c. Debris removal.
  - 2. Handling and disposal of removed materials.
  - 3. Dewatering of excavations as necessary to control surface and sub-surface water.
- B. Selective demolition of building elements for alteration purposes.
- C. Abandonment and removal of existing utilities and utility structures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 10 00 - Summary: Description of items to be removed by District.
- C. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- D. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- E. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- F. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- G. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- H. Section 31 22 00 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - Safety and Health Regulations for Construction.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

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**1.04 DEFINITIONS**

- A. Remove: Remove and legally dispose of items, except those identified for use in recycling, re-use, and salvage programs.
- B. Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human or animal life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural or historical purposes.
- C. Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively for the purpose of disposal.
  - 1. Inert Solids/Inert Waste: Non-liquid solid waste including, but not limited to, soil and concrete, that does not contain hazardous substances or soluble pollutants at concentrations in excess of water-quality standards established by a regional water board and does not contain significant quantities of decomposable solid waste.
- D. Class III Landfill: A landfill that accepts non-hazardous materials such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A Class III landfill must have a solid waste facilities permit from the State of California.
- E. Demolition Waste: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel. The materials may include rock, soil, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction or land development projects.
- F. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.
- G. Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
- H. Reuse: The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.
- I. Solid Waste: All putrescible and nonputrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by State law.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Construction Conference: Conduct a pre-construction conference one week prior to the start of the work of this section; require attendance by all affected trades.

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- B. Convene a conference at the Project site 3 days prior to starting demolition to review the Drawings and Specifications, requirements of authorities having jurisdiction, instructions and requirements of serving utilities, sequencing and interface considerations and project conditions.
- C. Conference shall be attended by DSA, supervisory and quality control personnel of Contractor and all subcontractors performing this and directly-related Work.
- D. Submit minutes of meeting to District, Project Inspector and Architect, for Project record purposes.
- E. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.
  - 1. Refer to sequence requirements specified in Section 01 10 00 - Summary; and construction progress schedule requirements specified in Section 01 32 16 - Construction Progress Schedule.

**1.06 MATERIALS OWNERSHIP**

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain property of South Orange County Community College District, demolished materials shall become the Contractor's property and shall be removed, recycled, or disposed from Project site in an appropriate and legal manner.
  - 1. Arrange a meeting no less than ten (10) days prior to demolition with the District or DSA and other designated representatives to review any salvagable items to determine if District wants to retain ownership, and discuss Contractor's Waste Management and Recycling Plan.

**1.07 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Site Plan: Showing:
  - 1. Areas for temporary construction and field offices.
  - 2. Areas for temporary and permanent placement of removed materials.
- C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
  - 2. Identify demolition firm and submit qualifications.
- D. Demolition phase:
  - 1. Proposed dust-control measures.
  - 2. Proposed noise-control measures.
  - 3. Schedule of demolition activities indicating the following:
    - a. Detailed sequence of demolition and removal work, including start and end dates for each activity.
    - b. Dates for shutoff, capping, and continuation of utility services.
  - 4. Contractor's Waste Management and Recycling Plan: See Section 01 74 19 - Construction Waste Management and Disposal.

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- a. This plan will not otherwise relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.
- 5. Contractor's Reuse, Recycling, and Disposal Report: See Section 01 74 19 - Construction Waste Management and Disposal.
- E. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.
  - 1. Record drawings: Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

**1.08 SUBMITTALS**

- A. Demolition and Removal Procedures and Schedule: Submit for Project record only.
- B. Project Record Drawings: Submit in accordance with provisions specified in Section 01 78 00 - Closeout Submittals. Indicate verified locations of underground utilities and storm drainage system on project record drawings.

**1.09 QUALITY ASSURANCE**

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
  - 1. Minimum of 5 years of documented experience.

**1.10 SCHEDULING**

- A. Schedule Work to precede new construction.
- B. Describe demolition removal procedures and schedule.
- C. Perform work between the hours of 7 am and 4 pm, subject to noise abatement regulations and District's approval for noise considerations.

**PART 2 PRODUCTS -- NOT USED**

**PART 3 EXECUTION**

**3.01 SCOPE**

- A. Remove paving and curbs as required to accomplish new work.
- B. Remove other items indicated, for salvage, relocation, and recycling.
- C. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

**3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Conform to the relevant Article of the General Conditions, South Coast Air Quality Management District and other applicable regulatory procedures when discovering hazardous or contaminated materials.
- B. Selective Demolition of Site and Building Elements:
  - 1. Use techniques acceptable to authorities having jurisdiction and which will achieve intended results and provide protection of surrounding features to remain.

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2. Some items may have been demolished prior to Work of this Contract. Verify existing conditions prior to start of demolition. If items are or have been demolished contact the Architect.
  3. Some items may require postponement of demolition until late in Contract Time period.
  4. Phase demolition as necessary to provide adequate interfacing of related Work.
  5. Demolish in an orderly and careful manner. Protect existing foundations, retaining walls, utility structures, other structures and finish materials to remain.
- C. Field Measurements and Conditions:
1. Survey existing conditions and correlate with requirements indicated to determine extent of demolition and recycling required.
  2. In addition to provisions of the Conditions of the Contract, verify dimensions and field conditions prior to construction. Verify condition of substrate and adjoining Work before proceeding with demolition Work. If conflict is found notify DSA, Project Inspector and Architect.
- D. Comply with other requirements specified in Section 01 70 00.
- E. Comply with governing EPA notification regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Obtain and pay for all permits required.
- F. Environmental Controls
1. Comply with federal, state and local regulations pertaining to water, air, solid waste, recycling, chemical waste, sanitary waste, sediment and noise pollution.
  2. Confine demolition activities to areas defined by public roads, easements, and work area limits indicated on the drawings.
  3. Temporary Construction: Remove indications of temporary construction facilities, such as haul roads, work areas, structures, stockpiles or waste areas.
  4. Water Resources: Comply with applicable regulations concerning the direct or indirect discharge of pollutants to underground and natural surface waters.
    - a. Oily Substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water in such quantities as to affect normal use, aesthetics, or produce a measurable ecological impact on the area.
      - 1) Store and service construction equipment at areas designated for collection of oil wastes.
  5. Dust Control, Air Pollution, and Odor Control: Prevent creation of dust, air pollution and odors.
    - a. Use temporary enclosures and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
    - b. Store volatile liquids, including fuels and solvents, in closed containers.
    - c. Properly maintain equipment to reduce gaseous pollutant emissions.
  6. Noise Control: Perform demolition operations to minimize noise.
    - a. Repetitive, high level impact noise will be permitted only during the times indicated in Section 01 70 00 - Execution and Closeout Requirements. Repetitive impact noise

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on the property shall not exceed the following dB limitations:

Sound Level in dB	Time Duration of Impact Noise
70	More than 12 minutes in any hour
80	More than 3 minutes in any hour

- b. Provide equipment, sound-deadening devices, and take noise abatement measures that are necessary to comply with the requirements of this Contract.
  - c. At least once every five successive working days while work is being performed above 55 dB noise level, measure sound level for noise exposure due to the demolition.
    - 1) Measure sound levels on the 'A' weighing network of a General Purpose sound level meter at slow response.
    - 2) To minimize the effect of reflective sound waves at buildings, measurements may be taken three to six feet in front of any building face.
- G. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
- 1. Obtain required permits.
  - 2. Comply with applicable requirements of NFPA 241.
  - 3. Use of explosives is not permitted.
  - 4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
    - a. Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.
      - 1) Retain a licensed and qualified civil or structural engineer to provide analysis, including calculations, necessary to ensure the safe execution of the demolition work.
    - b. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.
    - c. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.
  - 5. Provide, erect, and maintain temporary barriers and security devices.
    - a. Provide, erect, and maintain temporary barriers, safety and security devices , for protection of streets, sidewalks, curbs, adjacent property and the public.
    - b. Protection: Protect existing construction and adjacent areas with temporary barriers and security devices in accordance with requirements specified in Section 01 50 00 - Temporary Facilities and Controls.
      - 1) Review location and type of construction of temporary barriers with District and/or the DSA.
      - 2) Barriers shall control dust, debris and provide protection for persons occupying and using adjacent facilities.

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- 3) Maintain protected egress and access at all times, in accordance with requirements of authorities having jurisdiction and with permission of DSA (AHJ having jurisdiction).
- 6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
- 7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
- 8. Do not close or obstruct roadways or sidewalks without permit.
- 9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
- 10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- H. Do not begin removal until receipt of notification to proceed from District.
- I. Do not begin removal until built elements to be salvaged or relocated have been removed.
- J. Protect existing structures and other elements that are not to be removed.
  - 1. Provide bracing and shoring.
  - 2. Prevent movement or settlement of adjacent structures.
  - 3. Stop work immediately if adjacent structures appear to be in danger.
  - 4. Protect existing landscaping materials, appurtenances, structures and items that are not to be demolished, or are on adjacent property.
  - 5. Mark location of utilities.
- K. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- L. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.
- M. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect in accordance with requirements of Section 01 60 00 - Product Requirements.
- N. Perform demolition in a manner that maximizes salvage and recycling of materials.
  - 1. Comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.
  - 2. Dismantle existing construction and separate materials.
  - 3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
- O. Damages: Promptly repair damages to adjacent facilities caused by demolition operations.
- P. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

**3.03 EXISTING UTILITIES**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.

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- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to District.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to District.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

**3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as indicated.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
  - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 in locations indicated on drawings.
  - 2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
  - 2. Remove items indicated on drawings.
  - 3. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- E. Services (Including but not limited to Fire Protection and Electrical): Remove existing systems and equipment as indicated.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
  - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready

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for service.

3. See Section 01 10 00 for other limitations on outages and required notifications.
  4. Verify that abandoned services serve only abandoned facilities before removal.
  5. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
  4. Patch as specified for patching new work.

**3.05 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Waste Management.
- C. Remove temporary work.
- D. Leave site in clean condition, ready for subsequent work.
- E. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

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**SECTION 03 01 00  
MAINTENANCE OF CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cleaning of existing concrete surfaces.
- B. Resurfacing of concrete surfaces having spalled areas and other damage.
- C. Repair of deteriorated concrete.
- D. Scope of Work: As indicated on the drawings and as required as work progresses for hidden conditions after consultation with the Architect.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

**1.03 REFERENCE STANDARDS**

- A. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
- B. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
- C. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).
- D. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.
- E. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
- F. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- G. ASTM C928/C928M - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs.
- H. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- I. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Scheduling: Perform blast cleaning only between the hours of 7 am to 10 pm.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

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- C. Manufacturer's Qualification Statement.
- D. Cleaner's Qualification Statement.
- E. Installer's Qualification Statement.
- F. Project Record Documents: Accurately record actual locations of structural reinforcement repairs and type of repair.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Cleaner Qualifications: Company specializing in, and with minimum of 3 years of experience in, the type of cleaning specified.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with minimum of 3 years of documented experience.

**1.07 MOCK-UP(S)**

- A. Test each type of maintenance procedure required on each type of existing construction, to determine the most appropriate procedures to use and as a record of expected results.
- B. Crack Injection: Prepare one sample of each type of injection.
- C. Horizontal Surface Repair: Total of 10 foot square area, demonstrating each type of repair.
- D. Where color or texture matching is required, first prepare a small size sample on cementitious board.
- E. Locate mock-up(s) where directed.
- F. Re-work mock-up(s) until satisfactory to Architect.
- G. Satisfactory mock-up(s) may remain as part of the work.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.

**PART 2 PRODUCTS**

**2.01 CLEANING MATERIALS**

- A. Degreaser:
  - 1. Manufacturers:
    - a. Euclid Chemical Company; Euco Clean and Strip: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; CITREX: [www.lmcc.com/#sle](http://www.lmcc.com/#sle).
    - c. SpecChem, LLC; Orange Peel-Citrus Cleaner: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - d. W.R. Meadows, Inc: [www.wrmeadows.com](http://www.wrmeadows.com).
- B. Detergent: Non-ionic detergent.

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## 2.02 CEMENTITIOUS PATCHING AND REPAIR MATERIALS

- A. Manufacturers:
1. Adhesives Technology Corporation: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
  2. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  3. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
  4. Euclid Chemical Company: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
  5. Master Builders Solutions; [\_\_\_\_\_]: [www.master-builders-solutions.com/en-us/#sle](http://www.master-builders-solutions.com/en-us/#sle).
  6. The QUIKRETE Companies: [www.quikrete.com/#sle](http://www.quikrete.com/#sle).
  7. SpecChem, LLC: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
  8. W. R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  9. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Bonding Slurry: Water-based latex admixture complying with ASTM C1059/C1059M, combined with Portland cement and sand in accordance with admixture manufacturer's instructions.
1. Admixture Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; AKKRO-7T: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. The QUIKRETE Companies; QUIKRETE® Concrete Bonding Adhesive: [www.quikrete.com/#sle](http://www.quikrete.com/#sle).
    - d. SpecChem, LLC; Strong Bond - Acrylic Bonder: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - e. W. R. Meadows, Inc; Acry-lok: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- C. Cementitious Resurfacing Mortar: One- or two-component, factory-mixed, polymer-modified cementitious mortar designed for continuous thin-coat application.
1. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
  2. Recommended Thickness: Feather edge to 1/8 inch.
  3. Color: Gray.
  4. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX Feather Finish: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - c. Euclid Chemical Company; THIN TOP SUPREME: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - d. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; Duracrete: [www.lmcc.com/#sle](http://www.lmcc.com/#sle).
    - e. The QUIKRETE Companies; QUIKRETE® Concrete Resurfacer: [www.quikrete.com/#sle](http://www.quikrete.com/#sle).
    - f. SpecChem, LLC; Duo Patch: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - g. SpecChem, LLC; Final Finish: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - h. W. R. Meadows, Inc; Parge-All AF: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).

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- i. W. R. Meadows, Inc; Meadow-Patch T2: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- D. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.
  - 1. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.
  - 2. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX Feather Finish: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Five Star Products, Inc; Five Star Structural Concrete V/O: [www.fivestarprouducts.com/#sle](http://www.fivestarprouducts.com/#sle).
    - c. The QUIKRETE Companies; QUIKRETE® FastSet Repair Mortar: [www.quikrete.com/#sle](http://www.quikrete.com/#sle).
    - d. SpecChem, LLC; RepCon V/O: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - e. SpecChem, LLC; Duo Patch: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - f. W. R. Meadows, Inc; Meadow-Crete GPS: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- E. Cementitious Repair Mortar, Form and Pour/Pump Grade: Flowable, one- or two-component, factory-mixed, polymer-modified cementitious mortar; in-place material resistant to freeze/thaw conditions.
  - 1. Mixed with water in proportions as recommended by manufacturer.
  - 2. Integral corrosion inhibitor.
  - 3. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Five Star Products, Inc; Five Star Structural Concrete: [www.fivestarprouducts.com/#sle](http://www.fivestarprouducts.com/#sle).
    - c. SpecChem, LLC; Duo Patch; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - d. SpecChem, LLC; RepCon H-350; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - e. W. R. Meadows, Inc; Meadow-Crete FNP: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- F. Cementitious Pavement Repair Mortar: Fast hardening, flowable; composed of cement, sand, and additives; capable of setting in cold weather conditions without the aid of chloride- or gypsum-based accelerators; in-place material resistant to freeze/thaw conditions.
  - 1. Dry Material: Complies with ASTM C928/C928M.
  - 2. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Prospec; Premium Patch 100: [www.prospec.com](http://www.prospec.com).
    - c. Prospec; Premium Patch 200: [www.prospec.com](http://www.prospec.com).
    - d. SpecChem, LLC; RepCon 928: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - e. SpecChem, LLC; RepCon 928 FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - f. W. R. Meadows, Inc; Futura-15: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - g. W. R. Meadows, Inc; Futura-45 or Futura-45 Extended: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).

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- G. Cementitious Hydraulic Waterstop: Very fast setting, low slump, hand formable, and capable of stopping active water leaks; in-place material resistant to freeze/thaw conditions.
- H. Exterior Self-Leveling Concrete Topping: Portland cement-based; suitable as wear surface topping in exterior and wet locations as well as underlayment for applied materials.
  - 1. Compressive Strength: 4300 pounds per square inch, minimum, at 28 days, when tested in accordance with ASTM C109/C109M, air cured.
  - 2. Flexural Strength: 1000 pounds per square inch, minimum, at 28 days, when tested in accordance with ASTM C348.
  - 3. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX K301: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Kaufman Products Inc; SureFlow 042: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).

**2.03 EPOXY PATCHING AND REPAIR MATERIALS**

- A. Manufacturers:
  - 1. Adhesives Technology Corporation: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
  - 2. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
  - 3. Euclid Chemical Company: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
  - 4. Hi-Tech Systems: [hitechpolyurea.com](http://hitechpolyurea.com)
  - 5. SpecChem, LLC: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
  - 6. W. R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- B. Epoxy Repair Mortar: Epoxy resin mixed with aggregate and other materials in accordance with manufacturer's instructions for purpose intended; comply with pot life and workability limits.
  - 1. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; DURALFLEX FASTPATCH: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. SpecChem, LLC; SpecPoxy 1000, SpecPoxy 2000, SpecPoxy 3000 or SpecPoxy 3000 FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - d. W. R. Meadows, Inc; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000, Rezi-Weld LV, or Rezi-Weld LV State: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- C. Epoxy Injection Adhesive:
  - 1. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; DURAL FAST SET LV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. SpecChem, LLC; SpecPoxy 1000; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - d. W. R. Meadows, Inc; Rezi-Weld LV, Rezi-Weld LV State, Rezi-Weld (IP), or Rezi-Weld Gel Paste: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- D. Epoxy Bonding Adhesive: Non-sag, two-component, 100 percent solids; recommended by manufacturer for purpose and conditions under which used.

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1. Non-Load-Bearing Applications: ASTM C881/C881M Type I, II, III, IV, or V, whichever is appropriate to application.
2. Load-Bearing Applications: ASTM C881/C881M Type IV or V, whichever is appropriate to application.
3. Other Applications: ASTM C881/C881M Type as appropriate to application.
4. Manufacturers:
  - a. SpecChem, LLC; SpecPoxy 2000: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
  - b. SpecChem, LLC; SpecPoxy 3000: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
  - c. SpecChem, LLC; SpecPoxy 3000 FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
  - d. W. R. Meadows, Inc; Rezi-Weld Gel Paste: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - e. W. R. Meadows, Inc; Rezi-Weld Gel Paste State: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - f. W. R. Meadows, Inc; Rezi-Weld 1000: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).

#### **2.04 URETHANE PATCHING AND REPAIR MATERIALS**

- A. Polyurethane Repair Gel: Rapid setting, two-component; use with or without aggregate to repair cracks and spalls in concrete surfaces.
  1. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX ArdiFix: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - c. Euclid Chemical Company; EUCO QWIKstitch: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - d. Hi-Tech Systems; HT Spall-TX3: [hitechpolyurea.com](http://hitechpolyurea.com)

#### **2.05 ACCESSORIES**

- A. Anchoring Adhesive: Self-leveling or non-sag as applicable.
  1. Self-Leveling Polyester-Based Products:
    - a. W. R. Meadows, Inc; Poly-Grip: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  2. Self-Leveling Epoxy Products:
    - a. Euclid Chemical Company; DURAL FAST SET LV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. SpecChem, LLC; SpecPoxy 2000; [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - c. W. R. Meadows, Inc; Rezi-Weld 1000, Rezi-Weld (IP), or Rezi-Weld 3/2: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  3. Non-Sag Epoxy Products:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; DURAL FAST SET GEL: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. SpecChem, LLC; SpecPoxy 3000 or SpecPoxy 3000 FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - d. W. R. Meadows, Inc; Rezi-Weld Gel Paste or Rezi-Weld Gel Paste State: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
- B. Portland Cement: ASTM C150/C150M, Type I, grey.
- C. Sand: ASTM C33/C33M or ASTM C404; uniformly graded, clean.

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- D. Water: Clean and potable.
- E. Reinforcing Steel: ASTM A615/A615M Grade 60 (60,000 psi) billet-steel deformed bars, unfinished.
- F. Reinforcing Steel: Deformed bars, ASTM A996/A996M Grade 60 (420) Type A.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

**3.02 PREPARATION**

- A. Prepare concrete surfaces to be repaired according to ICRI 310.2R, CSP 3.

**3.03 CLEANING EXISTING CONCRETE**

- A. Provide enclosures, barricades, and other temporary construction as required to protect adjacent work from damage.
- B. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.
  - 1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.
  - 2. Clean out cracks and voids using same methods.
- C. The following are acceptable cleaning methods, in order from gentlest to less gentle:
  - 1. Water washing using low-pressure, maximum of 100 psi, and, if necessary, brushes with natural or synthetic bristles.
  - 2. Increasing the water washing pressure to maximum of 400 psi.
  - 3. Adding detergent to washing water; with final water rinse to remove residual detergent.
  - 4. Steam-generated low-pressure hot-water washing.
- D. Do not use any of the following cleaning methods, unless otherwise indicated:
  - 1. Brushes with wire bristles, grinding with abrasives, solvents, hydrochloric or muriatic acid, sodium hydroxide, caustic soda, or lye.
  - 2. Soap or detergent that is not non-ionic.
  - 3. Alkaline cleaning agents.
  - 4. Acidic cleaning agents.
  - 5. Abrasive blasting.

**3.04 CONCRETE SURFACE REPAIR USING CEMENTITIOUS MATERIALS**

- A. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.
- B. Apply coating of bonding agent to entire concrete surface to be repaired.
- C. Fill voids with cementitious mortar flush with surface.

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- D. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch over entire surface, terminating at a vertical change in plane on all sides.
- E. Trowel finish to match adjacent concrete surfaces.

**3.05 FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Section 01 40 00, will perform field inspection and testing.
  - 1. Test concrete for calcium chloride content during the execution of the Work.

**END OF SECTION**

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**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete formwork.
- B. Floors and slabs on grade.
- C. Concrete reinforcement.
- D. Joint devices associated with concrete work.
- E. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- B. Section 32 13 13 - Site Concrete: Sidewalks, curbs and gutters.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- C. ACI 301 - Specifications for Structural Concrete.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- F. ACI 305R - Guide to Hot Weather Concreting.
- G. ACI 306R - Guide to Cold Weather Concreting.
- H. ACI 308R - Guide to External Curing of Concrete.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- J. ACI 347R - Guide to Formwork for Concrete.
- K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- L. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
- M. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- N. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
- O. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).
- P. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- Q. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

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- R. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- S. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
- T. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
- U. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
- V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- W. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete.
- X. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- Y. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- Z. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
- AA. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- BB. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
- CC. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.
- DD. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- EE. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

#### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
  - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
  - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 19 - Concrete: Design and Durability Requirements, and Chapter 26 - Construction Documents and Inspection.
  - 3. Mix Design: Submit mix designs prepared, stamped and signed by a Civil Engineer licensed in the State of California.
- D. Quality Control Submittals:

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1. Field tests: Submit reports of all slump, strength and air content tests as required by authorities having jurisdiction and as indicated on the Drawings and specified herein.
  2. Delivery tickets: Have available copies of delivery tickets complying with ASTM C94/C94M for each load of concrete delivered to site. Include on the tickets the additional information specified in the ASTM document.
- E. Test Reports: Submit report for each test or series of tests specified.
- F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- G. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in District's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
1. Maintain one copy of each document on site.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.
- E. Regulatory Requirements:
1. Conform to California Building Code (CBC) Chapter 19A requirement, as amended and adopted by authorities having jurisdiction.
  2. Chemical products field-applied to concrete shall comply with applicable air quality requirements of authorities having jurisdiction.
    - a. Comply with Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions, CALGreen Section 5.504.4 Finish material pollutant control; 5.504.4.1 Adhesives, sealants and caulks; 5.504.4.3 Paints and coatings.
    - b. Comply with CALGreen Section A5.405.4 Recycled content.
    - c. Comply with CALGreen Section A5.406 Enhanced Durability and Reduced Maintenance.
- F. Testing Agency Services: District will engage an independent testing and inspection agency to conduct tests and perform other services specified for quality control during construction, as required by Section(s) 01 40 00 - Quality Requirements and 01 45 33 - Code-Required Special Inspections.
- G. Coordination: Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories. Coordinate concrete requirements with Work specified for underground utilities and mechanical and electrical equipment pads and bases.

**1.06 DELIVERY AND HANDLING**

- A. Protection During Concrete Placement: Provide protective coverings and runways, and use appropriate equipment and means of access to Work areas to avoid soiling or damage to

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existing conditions.

- B. Runoff: Prevent run off of water contaminated by construction agents and chemicals from soiling existing surfaces and from contaminating existing and future landscape areas.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Slabs with Porosity Inhibiting Admixture (PIA) or Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.
  - 1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
  - 2. Provide warranty by admixture manufacturer matching terms of flooring adhesive or primer manufacturer's material defect warranty.
- C. Moisture Emission-Reducing Curing and Sealing Compound, Membrane-Forming: Provide warranty to cover cost of flooring delamination failures for 10 years.
  - 1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.
  - 2. Provide warranty by manufacturer of MVRA matching terms of flooring adhesive or primer manufacturer's material defect warranty.
- D. Moisture Emission-Reducing Curing and Sealing Compound, Penetrating: Provide non-prorated warranty to cover cost of flooring delamination failures for 20 years.
  - 1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

**PART 2 PRODUCTS**

**2.01 FORMWORK**

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
  - 1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
  - 2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
  - 3. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

**2.02 REINFORCEMENT MATERIALS**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
  - 1. Type: Deformed billet-steel bars.

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- 2. Finish: Unfinished, unless otherwise indicated.
- B. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
  - 3. Provide stainless steel, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

**2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type II - Moderate Portland type.
  - 1. Cement used in contact with soil shall be Type V - Sulfate Resistant.
  - 2. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
  - 1. Acquire aggregates for entire project from same source.
  - 2. Fine and coarse aggregates, CBC Title 24, Part 2.
  - 3. Other than Structural Concrete: Conform to requirements for structural concrete.
- C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

**2.04 ADMIXTURES**

- A. Use no admixtures not included in mix design. Products of the following manufacturers are specified and will be acceptable provided they comply with referenced standards all other requirements of the Contract Documents:
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
  - 1. Manufacturers:
    - a. Euclid Chemical Company; ACCELGUARD 80: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
  - 1. Provide pigmented type, with ASTM C979/C979M inorganic pigments.
- E. Water Reducing Admixture: ASTM C494/C494M Type A.
  - 1. Manufacturers:
    - a. Euclid Chemical Company; EUCON NW: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Moisture Vapor Reducing Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs). Closes capillary systems formed during concrete curing to reduce moisture vapor emission and transmission. Reduces concrete shrinkage with no adverse effect on concrete properties or applied flooring.
  - 1. Installed admixture to meet or exceed Modified ASTM F1869 or ASTM F2170 testing to performance of moisture vapor emission rate (MVER) of 4 lbs/1,000 ft<sup>2</sup>/24 hours or

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lower.

- a. Alternative test methods shall be acceptable to the finish flooring manufacturer and installer.
2. The concrete ready mix supplier must coordinate with the admixture manufacturer before designing and testing any new mix designs, to receive guidance on achieving proper water absorption characteristics.
3. Manufacturers:
  - a. Barrier One Concrete Admixtures; MVRA-CPS: [www.barrierone.com/#sle](http://www.barrierone.com/#sle).
  - b. Hycrete, Inc: [www.hycrete.com/#sle](http://www.hycrete.com/#sle).
  - c. ISE Logik Industries, Inc; MVRA 900: [www.iselogik.com/#sle](http://www.iselogik.com/#sle).
  - d. Specialty Products Group; Vapor Lock 20/20: [www.spggogreen.com/#sle](http://www.spggogreen.com/#sle).
  - e. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.05 ACCESSORY MATERIALS

- A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  1. Grout: Comply with ASTM C1107/C1107M.
  2. Height Change, Plastic State; when tested in accordance with ASTM C827/C827M:
    - a. Maximum: Plus 4 percent.
    - b. Minimum: Plus 1 percent.
  3. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
  4. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
  5. Products containing aluminum powder are not permitted.
  6. Flowable Products:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; DURAGROUT: [www.laticrete.com/our-products/concrete-construction-chemicals/#sle](http://www.laticrete.com/our-products/concrete-construction-chemicals/#sle).
    - c. SpecChem, LLC; SC Precision Grout: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - d. W. R. Meadows, Inc; 588-10K: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - e. W. R. Meadows, Inc; 1428 HP: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
  7. Low-Slump, Dry Pack Products:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; Duragrout: [www.lmcc.com/#sle](http://www.lmcc.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.

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1. Composition: High solids content material exhibiting positive expansion when tested in accordance with ASTM C827/C827M.
  - a. Maximum Height Change: Plus 4 percent.
  - b. Minimum Height Change: Plus 1 percent.
2. Minimum Compressive Strength at 7 days, ASTM C579: 12,000 pounds per square inch.  
or
3. Minimum Compressive Strength at 7 days, ASTM D695: 12,000 pounds per square inch.
4. Manufacturers:
  - a. Euclid Chemical Company; E3-DEEP POUR: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
  - b. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
  - c. Five Star Products, Inc; Five Star DP Epoxy Grout: [www.fivestarprouducts.com/#sle](http://www.fivestarprouducts.com/#sle).
  - d. W. R. Meadows, Inc; REZI-WELD 3/2: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - e. Substitutions: See Section 01 60 00 - Product Requirements.

**2.06 BONDING AND JOINTING PRODUCTS**

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
  1. Manufacturers:
    - a. Euclid Chemical Company; AKKRO-7T: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. SpecChem, LLC; Strong Bond Acrylic Bonder: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - c. W. R. Meadows, Inc; ACRY-LOK-: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Epoxy Bonding System:
  1. Complying with ASTM C881/C881M and of Type required for specific application.
  2. Manufacturers:
    - a. Adhesives Technology Corporation: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
    - b. Euclid Chemical Company; DURAL FAST SET LV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. Euclid Chemical Company; DURALFLEX GEL: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - d. Euclid Chemical Company; DURALFLEX LV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - e. Euclid Chemical Company; DURAL 452 GEL, DURAL 452 LV, or DURAL 452 MV: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - f. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - g. SpecChem, LLC; SpecPoxy 1000, SpecPoxy 2000, SpecPoxy 3000, or SpecPoxy 3000FS: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - h. W. R. Meadows, Inc; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - i. Substitutions: See Section 01 60 00 - Product Requirements.

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- C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
  - 1. Material: Closed-cell, non-absorbent, compressible polymer foam in sheet form.
  - 2. Manufacturers:
    - a. W. R. Meadows, Inc; Deck-O-Foam Joint Filler with pre-scored top strip: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
  - 1. Manufacturers:
    - a. W. R. Meadows, Inc; Speed-E-Joint: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.
  - 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
  - 2. Height: To suit slab thickness.
- F. Dowel Sleeves: Plastic sleeve for smooth, round, steel load-transfer dowels.

**2.07 CURING MATERIALS**

- A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
  - 1. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company ; EUCOBAR: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. Nox-Crete Inc; Monofilm: [www.nox-crete.com/#sle](http://www.nox-crete.com/#sle).
    - d. SpecChem, LLC; SpecFilm Concentrate or SpecFilm: [www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).
    - e. W. R. Meadows, Inc ; Evapre or Evapre-RTU: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
  - 1. Product dissipates within 4 to 6 weeks.
  - 2. Provide product containing fugitive red dye.
  - 3. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; COLOR-CRETE CURE AND SEAL VOC: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).

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- c. W. R. Meadows, Inc; 1100-Clear: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - d. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Curing and Sealing Compound, Moisture Emission-Reducing, Membrane-Forming: Liquid, membrane-forming, clear sealer, for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission.
- 1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.
  - 2. Comply with ASTM C309 and ASTM C1315 Type I Class A.
  - 3. VOC Content: Less than 100 g/L.
  - 4. Solids Content: 25 percent, minimum.
  - 5. Manufacturers:
    - a. Floor Seal Technology, Inc; VaporSeal 309 System: [www.floorseal.com/#sle](http://www.floorseal.com/#sle).
    - b. Nox-Crete Inc; Cure & Seal 1200E: [www.nox-crete.com/#sle](http://www.nox-crete.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
- 1. Solids by Mass: 25 percent, minimum.
  - 2. VOC Content: OTC compliant.
  - 3. Manufacturers:
    - a. Euclid Chemical Company; DIAMOND CLEAR VOX: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - b. W. R. Meadows, Inc; CS-309-25 OTC: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Moisture-Retaining Sheet: ASTM C171.
- 1. Curing paper, regular.
  - 2. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
- F. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.
- G. Water: Potable, not detrimental to concrete.

**2.08 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Normal Weight Concrete:
  - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch.

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2. Water-Cement Ratio: Maximum 40 percent by weight.
3. Maximum Slump: 3 inches.
4. Maximum Aggregate Size: 1 inch.
  - a. Structural Concrete: Maximum size not larger than 1/5 of narrowest dimension between forms, 1/3 depth of slab nor 3/4 of minimum clear spacing between individual reinforcing bars.
  - b. Other than Structural Concrete: Conform to requirements for structural concrete.

## 2.09 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.
- C. Do not use shrinkage-reducing admixture (SRA) in same concrete batch with MVRA, PIA, or ACRA.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.
- B. Layout construction and control joints according to the drawing details and plans following these guidelines:
  1. Finished exposed concrete floors are critical for aesthetics.
  2. Layout joints on exposed concrete floors to allow for installation of utilities without sawcutting or concrete placement of different production batches subject to different colors. Staining and integral color concrete is not exempt from this requirement.
  3. Architect to review joint pattern submittal each floor.
  4. No lengthwise joints in corridors; place cross-corridor, if required.
  5. Place joint at 90 degree wall corners.
  6. Place joints at center line of columns.
  7. Equally space all joints.
- C. Verify that concrete cover requirements are met in formwork construction and reinforcement placement.
- D. Subbase: Per ACI 302.1R.
  1. As indicated on Drawings and approved by the Geotechnical Engineer.
    - a. Minimum 4 inch thick (or larger) base of 1/2 inch or larger clean aggregate, per CA Green Code 4.505.2.1 and CBC 1907.1A.
- E. Verify that all embedded products and formed openings and recesses are correctly placed.

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### 3.02 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent.
- C. Prepare previously placed concrete by cleaning with hydro-blasting or wet sand blasting to provide suitable surface for bonding. Provide minimum aggregate exposure of 1/4 inch.
- D. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- E. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
  - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
  - 2. Use latex bonding agent only for non-load-bearing applications.

### 3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

### 3.04 CONCRETE MIXING

- A. Concrete Mixing, General: Comply with ACI 318 as adopted by CBC, Title 24, Part 2, Chapter 19A and ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete. Introduce and mix admixtures in compliance with manufacturer's instructions and recommendations.

### 3.05 PLACING CONCRETE

- A. Notify District's Inspector and DSA at least 2 working days in advance of placing concrete.
- B. Place concrete in accordance with ACI 304R.
  - 1. General: Comply with ACI 318 as adopted by CBC, Title 24, Part 2, Chapter 19A and as follows:
    - a. Schedule continuous placement of concrete to prevent the formation of cold joints.
    - b. Deliver ready mix concrete in accordance with ASTM C94/C94M. Place concrete within 90 minutes after start of mixing.
    - c. Provide construction joints if concrete for a particular element or component cannot be placed in a continuous operation.
      - 1) Submit for review, proposed locations of joints prior to pouring. See Structural Drawings for additional requirements.
    - d. Deposit concrete as close as possible to its final location, to avoid segregation.

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2. Placement in Forms: Limit horizontal layers to depths which can be properly consolidated, but in no event greater than 24 inches.
  - a. Consolidate concrete by means of mechanical vibrators, inserted vertically in freshly placed concrete in a systematic pattern at close intervals. Penetrate previously placed concrete to ensure that separate concrete layers are knitted together.
  - b. Vibrate concrete sufficiently to achieve consistent consolidation without segregation of coarse aggregates.
  - c. Do not use vibrators to move concrete laterally.
- C. Hot Weather Placement: Comply with recommendations of ACI 305R when ambient temperature before, during, or after concrete placement is expected to exceed 90 deg F or when combinations of high air temperature, low relative humidity, and wind speed are such that the rate of evaporation from freshly poured concrete would otherwise exceed 0.2 lbs./SF/Hr..
  1. Use evaporation reducer.
  2. Do not add water to approved concrete mixes under any conditions.
  3. Provide mixing water at lowest feasible temperature, and provide adequate protection of poured concrete to reduce rate of evaporation.
  4. Use fog nozzle to cool formwork and reinforcing steel immediately prior to placing concrete.
- D. Cold-Weather Placement: Comply with provisions of ACI 306R when air temperature has fallen to or is expected to fall below 40 deg F. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  1. Uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- E. Place concrete for floor slabs in accordance with ACI 302.1R.
  1. Schedule continuous placement and consolidation of concrete within planned construction joints.
  2. Thoroughly consolidate concrete without displacing reinforcement or embedded items, using internal vibrators, vibrating screeds, roller pipe screeds or vibrating laser screed as described below.
- F. Notify Architect not less than 24 hours prior to commencement of placement operations.
- G. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- H. Ensure reinforcement and inserts will not be disturbed during concrete placement.
- I. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure

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water jetting.

- J. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### 3.06 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
  - 1. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07 92 00 for finish joint sealer requirements.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
  - 1. Separate slabs on grade from vertical surfaces with joint filler.
- D. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

### 3.07 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for compliance with specified tolerances.
- B. Maximum Variation of Surface Flatness:
  - 1. Exposed Concrete Floors: 1/4 inch in 10 feet.
  - 2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
- C. Curbs:
  - 1. Top of Curb: 1/4 inch in 10 ft, non-cumulative.
  - 2. Side of Curb: 1/8 inch in 10 ft, non-cumulative, vertical and horizontal.
- D. Correct the slab surface if tolerances are less than specified.
- E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### 3.08 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
  - 1. Remove honeycombed areas and other defective concrete down to sound concrete, cutting perpendicular to surface or slightly undercutting without damaging reinforcement. Dampen patch location and area immediately surrounding it prior to applying bonding compound or patching mortar.
  - 2. Before bonding compound has dried, apply patching mixture matching original concrete in materials and mix except for omission of coarse aggregate, and using a blend of white and normal portland cement as necessary to achieve color match. Consolidate thoroughly and strike off slightly higher than surrounding surface.
- B. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include seamless flooring.

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- 2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

**3.09 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
  - 1. Normal concrete: Not less than seven days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
  - 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
    - a. Spraying: Spray water over floor slab areas and maintain wet.
    - b. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
  - 2. Final Curing: Begin after initial curing but before surface is dry.
    - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
    - b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

**3.10 MISCELLANEOUS CONCRETE ITEMS**

- A. Filling In: Fill in holes and openings left in concrete structures for passage of Work specified in other Sections, after such Work is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work. Use non-shrink grout where required or indicated.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

**3.11 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

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- C. Provide free access to concrete operations at project site and cooperate with appointed firm.
- D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- E. Field Certifications: For all concrete, provide signed copy of batch plant's certificate stating quantity of each material, amount of water, admixtures, departure time and date accompanying each load of materials or concrete.
- F. Field Tests of Concrete: Perform tests in accordance with applicable California Building Code requirements, ACI 301 and requirements of authorities having jurisdiction.
- G. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- H. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure four concrete test cylinders. Obtain test samples for every 2,000 sq ft - 50 cu yd or less and structural concrete of each class of concrete placed (CBC requirement).
  - 1. Test one cylinder at 7 days and two at 28 days after placement.
  - 2. Maintain fourth cylinder to be tested at 56 days only if 28-day test fails to meet strength requirement.
  - 3. Take one additional test cylinder during cold weather concreting and cure it at job site under same conditions as concrete it represents. Test cold weather cylinder at 28 days.
- I. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- J. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.
- K. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

**3.12 DEFECTIVE CONCRETE**

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
  - 1. Obtain repair details from Architect (Structural Engineer) and approved by DSA before proceeding.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

**3.13 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.
- B. Protect concrete from marring and damage due to weather and construction activities.

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1. Protective measures shall include providing temporary coverings, and be in accordance with Section 01 50 00 - Temporary Facilities and Controls, and shall prohibit all non-essential construction activities, including cleaning and maintenance of construction equipment.
2. In particular, protect concrete floor slabs from oil, paint and other products that might penetrate and degrade concrete surface.

**END OF SECTION**

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**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel items.
- B. Requirements for materials and equipment for post-installed mechanical and adhesive anchors in concrete.

**1.02 RELATED REQUIREMENTS**

- A. Divisions 10 - Specialties, 22 - Plumbing, and 26 - Electrical: Mounting of equipment and components.
- B. Section 32 31 19 - Decorative Metal Fences and Gates: Tubular Steel Gates.

**1.03 REFERENCE STANDARDS**

- A. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures.
- B. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- I. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- J. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
- K. ASTM F594 - Standard Specification for Stainless Steel Nuts.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- M. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- O. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.

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- P. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel.
- Q. SSPC-PA 1 - Shop, Field, and Maintenance Painting of Steel.
- R. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
- S. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").
- T. SSPC-SP 3 - Power Tool Cleaning.
- U. SSPC-SP 5 - White Metal Blast Cleaning.
- V. SSPC-SP 6 - Commercial Blast Cleaning.
- W. SSPC-SP 10 - Near-White Blast Cleaning.
- X. SSPC-SP 2 - Hand Tool Cleaning.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. ICC ES Reports: If requested, ICC Evaluation Service report indicating conformance with ICC-ES Acceptance Criteria.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172 or AISC 201.

**1.05 QUALITY ASSURANCE**

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172 or AISC 201.
- C. Welder's Qualifications:
  - 1. Welding shall be performed by certified welders qualified in accordance with procedures specified in applicable referenced AWS standard, using materials, procedures and equipment of the type required for the Work.
  - 2. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.
- D. Testing Agency Qualifications: An independent agency qualified according to ASTM E329 and Section 01 45 33 for testing indicated.
- E. Installer Training: Prior to beginning the work, manufacturer or manufacturer's representative shall provide on-site training for all contractor's personnel who will be installing anchors.

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**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

- A. Conform to applicable requirements of California Building Code (CBC), Title 24, Part 2, as amended and adopted by authorities having jurisdiction.
  - 1. Comply with Title 24, Part 9, California Fire Code Chapter 35 "Welding and Other Hot Work."

**2.02 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M, for channels, angles and plates.
- B. Steel Tubing: ASTM A500/A500M Grade B cold-formed structural tubing and metal Gates in Section 32 31 19 - Decorative Metal Fences and Gates.
- C. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- D. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- E. Slotted Channel Fittings: ASTM A1011/A1011M.
- F. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- G. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- H. Bolts, Nuts, and Washers: As indicated on Drawings.
- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- J. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
  - 1. Comply with SSPC-PA 1. Coordinate with requirements specified in Section 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting .
    - a. Coordinate primer with finish paint and coating, as applicable, to provide sound foundation for field-applied topcoats despite prolonged exposure during construction.
- K. Galvanize all exterior steel members to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating.
- L. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

**2.03 FABRICATION**

- A. Ferrous Metal Surfaces, General:
  - 1. For metal fabrications exposed to view upon completion of the Work: Provide ferrous metals materials selected for their surface flatness, smoothness, and freedom from surface blemishes.
  - 2. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

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- B. Hot-dip galvanize fabricated ferrous items, indicated as remaining unpainted, after fabrication. Field connections shall be bolted or screwed where possible. Avoid field cutting and welding which damage galvanized coating.
- C. Fit and shop assemble items in largest practical sections, for delivery to site.
- D. Fabricate items with joints tightly fitted and secured.
- E. Gas cutting of non-structural steel items may be acceptable where stress is not transmitted through flame-cut surfaces.
  - 1. Make cuts clean and to contour.
  - 2. Deduct 1/8 inch from effective width of members cut by torch.
- F. Continuously seal joined members by intermittent welds and plastic filler.
- G. Joints Exposed to Weather or Water: Fabricate to keep water out, or provide adequate drainage of water that penetrates.
- H. Steel Tubing and Piping Fabrication: Unless otherwise indicated, close ends with plate stock so no exposed ends of tubing and piping. Grind all edges.
- I. Connections, General:
  - 1. Component parts of built-up members shall be well-pinned with closely-fitted contact.
  - 2. Conceal connections where possible.
  - 3. Otherwise, make countersinks for concealment after fabrication, except where noted.
- J. Welding: Conform to AWS D1.1/D1.1M recommendations.
  - 1. Do not field weld galvanized components to remain unfinished.
  - 2. Provide continuous welds at welded corners and seams.
  - 3. Grind exposed welds smooth and flush with base material.
  - 4. Re-weld to fill holes. Putties and fillers are not acceptable.
- K. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- L. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
  - 1. Bolted and Screwed Connections:
    - a. Provide holes and connections for work specified in other Sections.
    - b. Use bolts for field connections only.
    - c. Provide washers under heads and nuts bearing on wood.
    - d. Draw all nuts tight and nick threads of permanent connections.
    - e. Use beveled washers where bearing is on sloped surfaces.
    - f. Where screws must be used for permanent connections in ferrous metal, use flat head type, countersunk, with screw slots filled and finished smooth and flush.
- M. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

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**2.04 FABRICATED ITEMS**

- A. Rough Hardware
  - 1. Provide bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as indicated on Drawings.
- B. Other Products and Fabrications
  - 1. Other Products and Fabrications: Provide all materials not specifically described but required for a complete and proper installation, as selected by the Contractor, subject to review and acceptance by Construction Manager and Architect.
- C. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; electro-galvanized per ASTM B633 Type III, SC 1 finish.

**2.05 POST INSTALLED CONCRETE ANCHORS**

- A. Manufacturers:
  - 1. Manufacturers: Provide products as indicated on the approved Structural Drawings.
  - 2. Substitutions: Substitutions of products from manufacturer's not listed are not permitted.
    - a. Substitution of structural anchors requires structural calculations and DSA approval.
- B. Materials:
  - 1. Interior Use: For use in conditioned environments free from potential moisture, provide zinc plated carbon steel anchors.
  - 2. Exterior Use:
    - a. In exposed or potentially wet environments, and for attachment of exterior cladding materials, provide stainless steel anchors.
    - b. Stainless steel nuts and washers shall be of matching alloy group of equal or greater strength than the rod.
    - c. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
  - 3. Deformed Reinforcing Bars: Deformed steel rebar conforming to ASTM A615/A615M Grade 60. Permissible sizes as described in each adhesive products ICC report.
- C. Mechanical Anchors:
  - 1. Expansion, screw or undercut anchors having current ICC approval for use in cracked and uncracked concrete, with a published ICC Evaluation Service report.
    - a. Type and size as indicated on drawings.
  - 2. Basis of Design Approved Products conforming to this specification are acceptable for anchoring to concrete are as indicated on Drawings:
    - a. Hilti, Inc. Tulsa, OK; Hilti Kwik Bolt TZ Carbon and Stainless Steel Anchors in Cracked and Uncracked Concrete (ICC Report ESR-1917); [www.us.hilti.com](http://www.us.hilti.com).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  - 3. Basis of Design Approved Products conforming to this specification are acceptable for anchoring to grouted masonry are as follows:
    - a. Simpson Wedge-All Wedge Anchor (ICC-ES ESR-1396)

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- b. Hilti Kwik Bolt 3 Expansion Anchor (ICC-ES ESR-1385)
- c. Hilti Kwik Bolt TZ Expansion Anchor (ICC-ES ESR-3785)
- d. Simpson Titen HD Screw Anchor (ICC-ES ESR-1056)
- e. Substitutions: See Section 01 60 00 - Product Requirements.

D. Adhesive Anchors:

1. Cartridge Injection Adhesive Anchors: Threaded carbon steel rod, inserts, or reinforcing dowels complete with required nuts, washers, adhesive system and manufacturer's installation instructions.
  - a. Type and size as indicated on drawings.
  - b. Current ICC approval for use in cracked and uncracked concrete with a published ICC Evaluation Service report required.
2. Interior Use: Unless otherwise indicated on the Drawings, provide:
  - a. Carbon steel threaded rods conforming to specification as indicated on structural drawings. Where no specification and grade are indicated, provide: ASTM A193/A193M Type B7 with zinc plating in accordance with ASTM B633, Type III Fe/Zn 5 (SC1).
3. Exterior Use: As indicated on the Drawings, provide stainless steel anchors.
  - a. Stainless steel anchors shall be AISI Type 304 and Type 316 stainless steel provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener.
  - b. All nuts shall conform to ASTM F594, unless otherwise specified.
4. Basis of Design Approved Products conforming to this specification are acceptable for anchoring to concrete are as indicated on Drawings:
5. Basis of Design Approved Products conforming to this specification are acceptable for anchoring to grouted masonry are as indicated on Drawings:

E. Concrete and Masonry Screw Anchors:

1. Anchors shall be manufactured from carbon steel which is then heat-treated.
  - a. Anchors shall be zinc-plated in accordance with ASTM B633, Class SC1, Type III.
  - b. Current ICC approval for use in cracked and uncracked concrete with a published ICC Evaluation Service report required.
  - c. Provide anchors with a diameter and anchor length marking on the head.
2. Basis of Design Approved Products conforming to this specification are acceptable for anchoring to concrete are as follows:
  - a. Simpson Strong-Tie Company, Inc.; Simpson Titen HD anchor, (ICC Report ER-2713) heavy duty screw anchor for concrete; [www.simpsonanchors.com](http://www.simpsonanchors.com).
  - b. Hilti, Inc.; Hilti KWIK HUS-EZ (KH-EZ) and KWIK HUS-EZ I (KH-EZ I) Carbon Steel Screw Anchors For Use In Cracked and Uncracked Concrete (ICC Report ESR-3027); [www.hilti.com](http://www.hilti.com).
  - c. Substitutions: See Section 01 60 00 - Product Requirements.

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- F. Power-Driven/Powder Actuated Fasteners
  - 1. Use only if approved by Architect, generally not permitted where not specifically indicated or in load-bearing installations; as follows.
    - a. Hilti, Inc.; Hilti Low Velocity Power Driven Fasteners (ICC Report ESR-1663); [www.us.hilti.com](http://www.us.hilti.com).
    - b. Simpson Strong-Tie Company, Inc.; Simpson Strong-Tie® Powder-Actuated Fasteners, Threaded Studs and Assemblies (ICC Report ESR-2138); [www.strongtie.com](http://www.strongtie.com).

**2.06 FINISHES - STEEL**

- A. Mechanical Finishes: Complete finishing prior to fabrication wherever possible.
  - 1. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match finish.
  - 2. Protect finish on exposed surfaces by using temporary protective covering.
- B. Prime paint steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
  - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- C. Prepare surfaces to be primed in accordance with SSPC-SP2.
  - 1. Exterior fabrications: Clean in accordance with SSPC-SP 5, SSPC-SP 6, 8, or SSPC-SP 10.
  - 2. Interior fabrications: Clean in accordance with SSPC-SP 2, SSPC-SP 3, SSPC-SP 5, SSPC-SP 6, 8, or SSPC-SP 10.
- D. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- E. Prime Painting: One coat.
- F. Galvanizing of Structural Steel Members: Galvanize all exterior steel members after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- G. Galvanizing of Non-structural Items: Galvanize all exterior steel members after fabrication to ASTM A123/A123M requirements.

**2.07 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.
- F. Punch, drill and reaming in manner to leave clean, true lines and surfaces.
  - 1. Oversize hole 1/16 inch by punching, when material thickness is equal to or less than bolt diameter plus 1/8 inch.

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2. Sub-punch 1/16 inch smaller than bolt and drill or ream to oversize by 1/16 inch, when material thickness is thicker than bolt diameter plus 1/8 inch.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Field Inspection of Fabricated Products: Prior to installation, inspect products for damage and verify markings and dimensions against reviewed submittals.
- C. Environmental Conditions: Do not install products intended for interior locations when spaces are uncovered and unprotected from inclement weather.
- D. Coordination: Coordinate metal fabrications Work with Work specified in other Sections so that related Work shall be accurately and properly joined.
- E. Post Installed Anchors
  1. Verification of Conditions
    - a. Base Material Strength: Unless otherwise specified, do not drill holes in concrete until concrete has achieved full design strength.
    - b. Temperature of concrete surface and ambient air temperature must meet manufacturer’s requirements prior to use of adhesive anchor products.
    - c. Embedded Items:
      - 1) Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors.
      - 2) Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items.
      - 3) Take precautions as necessary to avoid damaging anything embedded in the concrete including electrical/telecommunications conduit, gas pipes, and plumbing pipes.
      - 4) Notify the Architect if reinforcing steel or other embedded items are encountered during drilling.
    - d. Beginning of installation indicates acceptance of existing conditions.

**3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete.
- C. Make provision for erection loads with temporary bracing. Keep work in alignment.
- D. Obtain Architect's review prior to site cutting or making adjustments not indicated on Drawings and reviewed shop drawings.

**3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.

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- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.
  - 1. Touch up galvanized steel with cold galvanizing compound.

**3.04 INSTALLATION OF POST-INSTALLED ANCHORS**

- A. Installation shall comply with all manufacturer’s instructions and current ICC ESR report.
- B. Post-Installed Anchors in Hardened Concrete.
  - 1. Drilled-in anchors and/or powder driven pins in existing non-prestressed reinforced concrete: use care and caution to avoid cutting or damaging the existing reinforcing bars.
  - 2. Maintain a minimum clearance of one inch between the reinforcement and the drilled-in anchor and/or pin.
- C. Manufacturer shall provide on-site training for all personnel who will be installing post-installed adhesive anchors at the beginning of the work. Installation of anchors must be performed by a certified installer.
- D. Where manufacturer recommends use of special tools for installation of anchors, such tools shall be used, unless otherwise permitted specifically by the Engineer.
- E. Drill holes with rotary impact hammer drills using carbide-tipped bits. Bits must be of type required and permitted by ICC ESR report.
  - 1. Drill holes with rotary impact hammer drills using carbide-tipped bits or core drills using diamond core bits.
  - 2. Drill bits shall be of diameters as specified by the anchor manufacturer.
  - 3. Unless otherwise shown on the Drawings, all holes shall be drilled perpendicular to the concrete surface.
  - 4. Where anchors are to be installed in cored holes, use core bits with matched tolerances as specified by the manufacturer.
  - 5. Cored holes may only be used if acceptable to the Engineer and in compliance with ICC ESR report.
- F. Holes shall be cleared of debris after holes are drilled per manufacturer’s instructions.
  - 1. For adhesive installations, at a minimum, holes shall be blown out with oil-free compressed air and shall be brushed with a wire or nylon brush.
  - 2. Holes shall than be blown out one additional time with oil-free compressed air.
  - 3. Additional hole cleaning requirements may be required by manufacturer and ICC ESR Report.
- G. During adhesive curing time period, the temperature of the substrate shall be kept above the minimum substrate temperature as defined by the manufacturer. Contractor shall determine the appropriate means and methods to ensure that the temperature is kept above the

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required minimum temperature required before adhesive installation is begun.

### 3.05 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

### 3.06 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 45 33 - Code-Required Special Inspections.
- B. Inspection: Special inspection of post-installed anchors shall be provided as required by the ICC-ES report for that anchor and not less than the requirements of the Structural Drawings and the following (whichever is the most restrictive):
  - 1. Continuously observe the installation of all anchors, or as specified in the ICC report.
    - a. Minimum anchor embedments, proof loads and torques shall be as shown on the Drawings.
    - b. Load Testing: Per Structural General Notes on Drawings.
    - c. Verify anchor type, anchor dimensions, hole dimensions, anchor spacing, edge distances, anchor embedment and adherence to the manufacturer's published installation instructions.
    - d. For adhesive anchors also verify hole cleaning technique, adhesive expiration date and proper mixing and dispensing.
  - 2. Subsequent inspection of installation will be required when there is a change of personnel doing the installation. Change is defined as any one or more persons drilling or preparing holes, or installing anchors.
  - 3. Visually inspect 100% of all installed anchors.
- C. Reporting:
  - 1. Daily reports shall reference the applicable ICC-ES report number, indicate that all specified criteria were complied with and provide itemized verification of all inspected items.
  - 2. Special Inspector shall immediately report any deviations from the requirements to the Architect.
- D. Defective Work:
  - 1. Installations that are not accepted by the Special Inspector shall be considered defective.
  - 2. Provide additional testing and inspection to determine acceptability of defective work, as directed by the Architect at Contractor's expense.

### 3.07 REPAIR OF DEFECTIVE WORK

- A. Remove and replace misplaced, defective or malfunctioning anchors at Contractor's expense. Replacement of anchors requires signed structural detail, unless otherwise noted.

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- B. Fill empty anchor holes and patch failed anchor locations with high-strength, non-shrink non-metallic grout.

**END OF SECTION**

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**SECTION 07 92 00  
JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.
- D. District-provided field quality control.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

**1.03 REFERENCE STANDARDS**

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.
- B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants.
- C. ASTM C834 - Standard Specification for Latex Sealants.
- D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- H. ASTM C1311 - Standard Specification for Solvent Release Sealants.
- I. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
- J. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.
- K. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness.
- L. SWRI (VAL) - SWR Institute Validated Products Directory.

**1.04 SUBMITTALS**

- A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  - 2. List of backing materials approved for use with the specific product.

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3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  4. Substrates the product should not be used on.
  5. Substrates for which use of primer is required.
  6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
  7. Sample product warranty.
  8. Certification by manufacturer indicating that product complies with specification requirements.
  9. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.
- B. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
  - C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
  - D. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
  - E. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
  - F. Installation Plan: Submit at least four weeks prior to start of installation.
  - G. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
  - H. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
  - I. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
  - J. Installation Log: Submit filled out log for each length or instance of sealant installed.
  - K. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.
  - L. Installer's Qualification Statement.

**1.05 QUALITY ASSURANCE**

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

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- D. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
  - 1. Adhesion Testing: In accordance with ASTM C794.
  - 2. Compatibility Testing: In accordance with ASTM C1087.
  - 3. Allow sufficient time for testing to avoid delaying the work.
  - 4. Deliver to manufacturer sufficient samples for testing.
  - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
  - 6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
  
- E. Installation Plan: Include schedule of sealed joints, including the following.
  - 1. Joint width indicated in Contract Documents.
  - 2. Joint depth indicated in Contract Documents; to face of backing material at centerline of joint.
  - 3. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgement that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
  - 4. Approximate date of installation, for evaluation of thermal movement influence.
  - 5. Installation Log Form: Include the following data fields, with known information filled out.
    - a. Unique identification of each length or instance of sealant installed.
    - b. Location on project.
    - c. Substrates.
    - d. Sealant used.
    - e. Stated movement capability of sealant.
    - f. Primer to be used, or indicate as "No primer" used.
    - g. Size and actual backing material used.
    - h. Date of installation.
    - i. Name of installer.
    - j. Actual joint width; provide space to indicate maximum and minimum width.
    - k. Actual joint depth to face of backing material at centerline of joint.
    - l. Air temperature.
  
- F. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
  - 1. Identification of testing agency.
  - 2. Name(s) of sealant manufacturers' field representatives who will be observing

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3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
  - a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
  - b. Test date.
  - c. Location on project.
  - d. Sealant used.
  - e. Stated movement capability of sealant.
  - f. Test method used.
  - g. Date of installation of field sample to be tested.
  - h. Date of test.
  - i. Copy of test method documents.
  - j. Age of sealant upon date of testing.
  - k. Test results, modeled after the sample form in the test method document.
  - l. Indicate use of photographic record of test.
  
- G. District will employ an independent testing agency to perform the field quality control inspection and testing as referenced in PART 3 of this section and as follows, to prepare and submit the field quality control plan and log, and to provide recommendations of remedies in the case of failure.
  1. Contractor shall cooperate with testing agency and repair failures discovered and destructive test location damage.
  
- H. Field Quality Control Plan:
  1. Visual inspection of entire length of sealant joints.
  2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
    - a. For each different sealant and substrate combination, allow for one test every 12 inches in the first 10 linear feet of joint and one test every 24 inches thereafter.
    - b. If any failures occur in the first 10 linear feet, continue testing at 12 inches intervals at no extra cost to District.
  3. Destructive field adhesion testing of sealant joints, except interior acrylic latex sealant.
    - a. For each different sealant and substrate combination, allow for one test every 100 feet in the first 1000 linear feet, and one test per 1000 linear feet thereafter, or once per floor on each elevation.
    - b. If any failures occur in the first 1000 linear feet, continue testing at frequency of one test per 500 linear feet at no extra cost to District.
  4. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.
  
- I. Field Adhesion Test Procedures:

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1. Allow sealants to fully cure as recommended by manufacturer before testing.
  2. Have a copy of the test method document available during tests.
  3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
  4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
  5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
  6. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to District.
  7. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- J. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
1. Record results on Field Quality Control Log.
  2. Repair failed portions of joints.
- K. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
1. Sample: At least 18 inches long.
  2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
  3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.
  4. Record results on Field Quality Control Log.
  5. Repair failed portions of joints.
- L. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

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## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
1. Adhesives Technology Corporation: [www.atcepoxy.com](http://www.atcepoxy.com).
  2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  3. Dow Corning Corporation: [www.dowcorning.com/construction/sle](http://www.dowcorning.com/construction/sle).
  4. Fortifiber Building Systems Group: [www.fortifiber.com/sle](http://www.fortifiber.com/sle).
  5. Hilti, Inc: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
  6. Master Builders Solutions by BASF: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
  7. Momentive Performance Materials, Inc (formerly GE Silicones): [www.momentive.com/sle](http://www.momentive.com/sle).
  8. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  9. QUIKRETE Companies: [www.quikrete.com/#sle](http://www.quikrete.com/#sle).
  10. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
  11. Sika Corporation: [www.usa-sika.com](http://www.usa-sika.com).
  12. Specified Technologies Inc: [www.stifirestop.com/#sle](http://www.stifirestop.com/#sle).
  13. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  14. W.R. Meadows, Inc: [www.wrmeadows.com/sle](http://www.wrmeadows.com/sle).
  15. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
1. Adhesives Technology Corporation: [www.atcepoxy.com](http://www.atcepoxy.com).
  2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  3. Dayton Superior Corporation: [www.daytonsuperior.com](http://www.daytonsuperior.com).
  4. Dow Corning Corporation: [www.dowcorning.com/construction/sle](http://www.dowcorning.com/construction/sle).
  5. Master Builders Solutions by BASF: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
  6. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  7. QUIKRETE Companies: [www.quikrete.com/#sle](http://www.quikrete.com/#sle).
  8. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
  9. Sika Corporation: [www.usa-sika.com](http://www.usa-sika.com).
  10. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  11. W.R. Meadows, Inc: [www.wrmeadows.com/sle](http://www.wrmeadows.com/sle).
  12. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 JOINT SEALANT APPLICATIONS

### A. Scope:

1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
  - a. Wall expansion and control joints.
    - 1) Unit Masonry.
    - 2) Cement Plastering System.
    - 3) Metal and Composite Panels.
    - 4) Siding.
  - b. Construction joints in cast-in-place concrete
  - c. Joints between door, window, and other frames and adjacent construction.
  - d. Joints between different exposed materials.
  - e. Openings below ledge angles in masonry.
  - f. Control and expansion joints in ceilings and other overhead surfaces.
  - g. Other joints indicated below.
2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
  - a. Joints between door, window, and other frames and adjacent construction.
  - b. Control and expansion joints on exposed interior surfaces of exterior walls.
  - c. Perimeter joints of exterior openings where indicated.
  - d. Control and expansion joints in tile.
  - e. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
    - 1) Exception: Such gaps and openings in gypsum board finished stud walls and suspended ceilings.
    - 2) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
  - f. Other joints indicated below.
3. Do not seal the following types of joints.
  - a. Intentional weepholes in masonry.
  - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
  - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
  - d. Joints where installation of sealant is specified in another section.
  - e. Joints between suspended panel ceilings/grid and walls.

- B. Type EP-1 - Exterior Joints: Use non-sag non-staining silicone sealant at storefront and openings, unless otherwise indicated.
- C. Type SM-1 - Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
- D. Type SM-1 - Lap Joints between Manufactured Metal Panels: Butyl rubber, non-curing.
- E. Type CP-1 - Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.
- F. Type IP-1 - Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
- G. Type IA-1 - Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
- H. Type WP-1 - Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
- I. Type FS-1 - Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
- J. Type IA-1 - In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
- K. Type WFP-1 - Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.
- L. Interior Wet Areas: restrooms and kitchens; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.
- M. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

**2.03 JOINT SEALANTS - GENERAL**

- A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 61 16.
- B. Colors: As indicated on the drawings. Match adjacent surface.

**2.04 NONSAG JOINT SEALANTS**

- A. Type NS-1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 50 percent, minimum.
  - 2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: To be selected by Architect from manufacturer's full range.
  - 4. Cure Type: Single-component, neutral moisture curing.
  - 5. Service Temperature Range: Minus 20 to 180 degrees F.
  - 6. Manufacturers:
    - a. Dow Chemical Company; DOWSIL 790 Silicone Building Sealant: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
    - b. Dow Chemical Company; DOWSIL 791 Silicone Weatherproofing Sealant: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
    - c. Dow Chemical Company; DOWSIL 795 Silicone Building Sealant: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).

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- d. Momentive Performance Materials, Inc (formerly GE Silicones): [www.momentive.com/sle](http://www.momentive.com/sle).
  - e. Pecora Corporation; Pecora 864 NST (Non-Staining Technology): [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - f. Sika Corporation; Sikasil WS-290: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
  - g. Sika Corporation; Sikasil WS-295: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
  - h. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
- 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Color: To be selected by Architect from manufacturer's full range.
  - 3. Cure Type: Single-component, neutral moisture curing
  - 4. Service Temperature Range: Minus 65 to 180 degrees F.
  - 5. Manufacturers:
    - a. Fortifiber Building Systems Group; Moistop Sealant: [www.fortifiber.com/#sle](http://www.fortifiber.com/#sle).
    - b. Dow Chemical Company; DOWSIL 999-A Building and Glazing Sealant: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
    - c. Pecora Corporation; Pecora 890FTS (Field Tintable Smooth): [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - d. Momentive Performance Materials, Inc (formerly GE Silicones): [www.momentive.com/sle](http://www.momentive.com/sle).
    - e. Sherwin-Williams Company; Silicone Rubber All Purpose Sealant: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - f. Sika Corporation; Sikasil GP: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - g. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Type FS-1 - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
- 1. Color: White.
  - 2. Manufacturers:
    - a. BASF Construction Chemicals-Building Systems; OmniPlus, by Sonneborn Building Products Div.: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).
    - b. Dow Corning Corporation; 786 Silicone Sealant: [www.dowcorning.com](http://www.dowcorning.com).
    - c. Momentive Performance Materials, Inc (GE Silicones products); Silpruf SCS 1700 Sanitary: [www.momentive.com](http://www.momentive.com).
    - d. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - e. Sika Corporation; Sikasil GP: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.

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- D. Type ST-1 - Silyl-Terminated Polyether (STPE) and Polyurethane (STPU) Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 35 percent, minimum.
  2. Hardness Range: 20 to 40, Shore A, when tested in accordance with ASTM C661.
  3. Color: To be selected by Architect from manufacturer's full range.
  4. Service Temperature Range: Minus 40 to 180 degrees F.
  5. Manufacturers:
    - a. Sherwin-Williams Company; Stampede 100 Low-Modulus Hybrid Urethane Sealant: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Type PS-1 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
1. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  2. Color: To be selected by Architect from manufacturer's full range.
  3. Service Temperature Range: Minus 40 to 180 degrees F.
  4. Manufacturers:
    - a. Master Builders Solutions by BASF; MasterSeal NP1: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
    - b. Sherwin-Williams Company; Stampede-1/-TX Polyurethane Sealant: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - c. Sika Corporation; Sikaflex-1a: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - d. Sika Corporation; Sikaflex-15 LM: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - e. W. R. Meadows, Inc; POURTHANE NS: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Type WP-1 - Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface .
1. Movement Capability: Plus and minus 35 percent, minimum.
  2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  3. Color: To be selected by Architect from manufacturer's full range.
  4. Service Temperature Range: Minus 40 to 180 degrees F.
  5. Manufacturers:
    - a. Sika Corporation; Sikaflex-1a: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- G. Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
1. Movement Capability: Plus and minus 25 percent, minimum.

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2. Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.
  3. Color: To be selected by Architect from manufacturer's full range.
  4. Service Temperature Range: Minus 40 to 180 degrees F.
- H. Type IA-1 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
1. Color: To be selected by Architect from manufacturer's full range.
  2. Grade: ASTM C834; Grade Minus 18 Degrees C (0 Degrees F).
  3. Manufacturers:
    - a. Hilti, Inc; CP 506 Smoke and Acoustical Sealant: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
    - b. Hilti, Inc; CP 572 Smoke and Acoustical Spray Sealant: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
    - c. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
    - d. Sherwin-Williams Company; 950A Siliconized Acrylic Latex Caulk: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - e. Specified Technologies Inc; Smoke N' Sound Acoustical Sealant: [www.stifirestop.com/#sle](http://www.stifirestop.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, non-sag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.

## 2.05 SELF-LEVELING SEALANTS

- A. Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
  2. Hardness Range: 0 to 15, Shore A, when tested in accordance with ASTM C661.
  3. Color: To be selected by Architect from manufacturer's full range.
  4. Service Temperature Range: Minus 40 to 180 degrees F.
  5. Manufacturers:
    - a. Sika Corporation; Sikasil 728SL: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  6. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
  7. Color: To be selected by Architect from manufacturer's full range.
  8. Service Temperature Range: Minus 40 to 180 degrees F.
  9. Manufacturers:
    - a. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
    - b. Sherwin-Williams Company; Stampede 1SL Polyurethane Sealant: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
    - c. Sika Corporation; Sikaflex-1c SL: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).

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- d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Type WFP-1 - Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: To be selected by Architect from manufacturer's full range.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
  - 5. Manufacturers:
    - a. Sika Corporation; Sikaflex-1c SL: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
    - b. W. R. MEADOWS, Inc; POURTHANE SL: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Self-Leveling Polysulfide Sealant: ASTM C920, Grade P, Uses M and A; multicomponent; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
  - 1. Movement Capability: Plus and minus 25 percent.
  - 2. Hardness Range: 30 to 55, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: To be selected by Architect from manufacturer's full range.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
  - 5. Manufacturers:
    - a. W.R. Meadows, Inc; Deck-O-Seal (pourable): [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Rigid Self-Leveling Polyurethane Joint Filler: Two part, low viscosity, fast setting; intended for cracks and control joints not subject to significant movement.
  - 1. Hardness Range: Greater than 100, Shore A, and 50 to 80, Shore D, when tested in accordance with ASTM C661.
  - 2. Manufacturers:
    - a. ARDEX Engineered Cements; ARDEX ARDIFIX: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Semi-Rigid Self-Leveling Polyurea Joint Filler: Two-component, 100 percent solids; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
  - 1. Durometer Hardness, Type A: 75, minimum, after seven days when tested in accordance with ASTM D2240.
  - 2. Color: To be selected by Architect from manufacturer's standard colors.
  - 3. Joint Width, Minimum: 1/8 inch.
  - 4. Joint Depth: Provide product suitable for joints from 1/8 inch to 1 inch in depth excluding space for backer rod.
  - 5. Manufacturers:

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- a. Adhesives Technology Corporation; [\_\_\_\_]: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
- b. ARDEX Engineered Cements; ARDEX ARDISEAL RAPID PLUS: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
- c. Euclid Chemical Company; EUCO QWIKjoint UVR: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
- d. Nox-Crete Inc; DynaFlex JF-85: [www.nox-crete.com/#sle](http://www.nox-crete.com/#sle).
- e. Substitutions: See Section 01 60 00 - Product Requirements.

**2.06 ACCESSORIES**

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
  - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
  - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
  - 3. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
  - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
  - 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
  - 3. Arrange for sealant manufacturer's technical representative to be present during tests.
  - 4. Record each test on Preinstallation Adhesion Test Log as indicated.
  - 5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.

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- 6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

**3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

**3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
  - 1. Width/depth ratio of 2:1.
  - 2. Neck dimension no greater than 1/3 of the joint width.
  - 3. Surface bond area on each side not less than 75 percent of joint width.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

**3.04 FIELD QUALITY CONTROL**

- A. District will employ an independent testing agency to perform field quality control inspection and testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.
- C. Destructive Adhesion Testing: If there are any failures in first 1000 linear feet, notify Architect immediately.
- D. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

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E. Repair destructive test location damage immediately after evaluation and recording of results.

**3.05 POST-OCCUPANCY**

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

**END OF SECTION**

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**SECTION 08 06 71  
DOOR HARDWARE SCHEDULE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preliminary schedule of door hardware sets for swinging as indicated on drawings.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 71 00 - Door Hardware: Requirements to comply with in coordination with this section.

**1.03 REFERENCE STANDARDS**

- A. BHMA (CPD) - Certified Products Directory.
- B. BHMA A156.3 - American National Standard for Exit Devices.
- C. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks.
- D. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000.
- E. BHMA A156.18 - American National Standard for Materials and Finishes.
- F. DHI (H&S) - Sequence and Format for the Hardware Schedule.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Comply with submittal requirements as indicated in Section 08 71 00.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Only manufacturers listed in Door Hardware Schedule or Section 08 71 00 are considered acceptable, unless noted otherwise.
- B. Obtain each type of door hardware as indicated from a single manufacturer and single supplier.
- C. Products are listed and certified compliant with specified standards by BHMA (CPD).
- D. Manufacturer's Abbreviations: Coordinate with manufacturers listed in Section 08 71 00.
  - 1. AR/AD - Adams Rite, Assa Abloy Door Security Solutions.
  - 2. BM - Besam, Assa Abloy Door Security Solutions.
  - 3. CR/RU - Corbin Russwin, Assa Abloy Door Security Solutions.
  - 4. CUR - Curries, Assa Abloy Door Security Solutions.
  - 5. HES/HS - HES, Assa Abloy Door Security Solutions.
  - 6. HD - HID Global, Assa Abloy Door Security Solutions.
  - 7. KNX/KNO - Knox Company.

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8. LOC - Loconix
9. MCK/MK - McKinney, Assa Abloy Door Security Solutions.
10. PEM/PE - Pemko, Assa Abloy Door Security Solutions.
11. RIX/RF - Rixson Specialty Door Controls, Assa Abloy Door Security Solutions.
12. SA - Sargent, Assa Abloy Door Security Solutions.
13. SEC/SU - Securitron, Assa Abloy Door Security Solutions.
14. YA - Yale, Assa Abloy Door Security Solutions.
15. TBD - To be determined.
16. BYO/OT - By Others.

**2.02 DESCRIPTION**

- A. Door hardware sets provided represent the design intent, they are only a guideline and should not be considered a detailed or complete hardware schedule.
  1. Provide door hardware item(s) as required for similar purposes, even when item is not listed for a door in Door Hardware Schedule.
  2. Necessary items that are not included in a Hardware Set should be added and have the appropriate additional hardware as required for proper application and functionality.
  3. Door hardware supplier is responsible for providing proper size and hand of door for products required in accordance with Door Hardware Schedule and as indicated on drawings.
  4. Quantities listed are for each Pair (PR) of doors, or for each Single (SGL) door, as indicated in hardware sets.

**2.03 LOCK FUNCTION CODES**

- A. Function Codes for Cylindrical Locks: Complying with BHMA A156.5.
- B. Function Codes for Mortise Locks: Complying with BHMA A156.13.
- C. Function Codes for Exit Devices: Complying with BHMA A156.3.

**2.04 FINISHES**

- A. Finishes: Complying with BHMA A156.18.

**PART 3 EXECUTION**

**3.01 DOOR HARDWARE SCHEDULE**

- A. Organize listing of door hardware components within each hardware set in compliance with 10-Part scheduling sequence indicated in DHI (H&S), unless otherwise indicated.
- B. See door schedule in drawings for hardware set assignments.
- C. No hardware shall be ordered until Finished Hardware has been reviewed and approved by Architect’s hardware consultant.
- D. Provide Factory order numbers for all products supplied on this project as part of close out documents for District’s warranty records.

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- E. Any door count quantity shown in the HW set listings is for reference only. Contractor shall verify all door quantities with the Architectural Drawings.
- F. Hardware Sets:

**HW-1**

G1 G2 G3

Each gate to have

1	EXIT DEVICE	8888/8810	32D	SAR
1	LEVER LATCHSET	700 SERIES ET CONTROL	32d	SAR
1	RIM CYLINDER	20-057-ICX	626	SCH
1	PERMANENT CORE	23-030	626	SCH
1	ARMOR COLLAR	K-24	626	KEE
1	GATE BOX	K-BX4152	600	KEE
1	GATE CLOSER	MAMMOTH (HD) -180 w/ DINO HINGE	689	LOC
1	Electric Power Transfer	CEPT-C5E		SU
1	ElectroLynx Harness	PoE-C1500P		MK
1	ElectroLynx Harness	PoE-C__P		MK
	HID RP40 Card Readers Balance of material provided by Gate Fabricator			
Notes: Operational Narrative – At all times, door is closed and locked. Upon presentation of valid credential at the exit device trim, the latch will momentarily unlatch. Free egress at all times. Upon loss of power door will remain closed and locked.				

**END OF SECTION**

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**SECTION 08 71 00  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for gates as doors.
- B. Electrically operated and controlled hardware.
- C. Lock cylinders for doors that hardware is specified in other sections.
- D. Gate hardware as noted.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 06 71 - Door Hardware Schedule: Schedule of door hardware sets.
- B. Section 10 14 00 - Signage: Additional signage requirements.
- C. Section 28 10 00 - Access Control: Electronic access control devices.
- D. Section 32 31 19 - Decorative Metal Fences and Gates.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. BHMA (CPD) - Certified Products Directory.
- C. BHMA A156.3 - American National Standard for Exit Devices.
- D. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks.
- E. BHMA A156.16 - American National Standard for Auxiliary Hardware.
- F. BHMA A156.17 - American National Standard for Self Closing Hinges & Pivots.
- G. BHMA A156.20 - American National Standard for Strap and Tee Hinges, and Hasps.
- H. BHMA A156.28 - American National Standard for Recommended Practices for Mechanical Keying Systems.
- I. DHI (H&S) - Sequence and Format for the Hardware Schedule.
- J. DHI (KSN) - Keying Systems and Nomenclature.
- K. CEC California Electrical Code
- L. UL (DIR) - Online Certifications Directory.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; attendance is required by affected installers and the following:

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1. Architect.
  2. Installer's Architectural Hardware Consultant (AHC).
  3. Hardware Installer.
  4. Owner's Security Consultant.
- D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- E. Keying Requirements Meeting:
1. Schedule meeting at project site prior to Contractor occupancy.
  2. Attendance Required:
    - a. Contractor.
    - b. District and relevant staff.
    - c. Architect.
    - d. Installer's Architectural Hardware Consultant (AHC).
    - e. Hardware Installer.
    - f. Owner's Security Consultant.
  3. Agenda:
    - a. Establish keying requirements.
    - b. Verify locksets and locking hardware are functionally correct for project requirements.
    - c. Verify that keying and programming complies with project requirements.
    - d. Establish keying submittal schedule and update requirements.
  4. Contractor to provide a blank key schedule in excel format for District review and approval prior to formal submittal.
  5. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
    - a. Access control requirements.
    - b. Key control system requirements.
    - c. Schematic diagram of preliminary key system.
  6. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, District, participants, and those affected by decisions made.
    - a. Furnish District's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the District.
  7. Deliver established keying requirements to manufacturers.

**1.05 SUBMITTALS**

- A. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

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- B. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
  - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
  - 2. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.
    - a. Submit in vertical format; see Section 08 0671.
  - 3. List groups and suffixes in proper sequence.
  - 4. Provide complete description for each door listed.
  - 5. Provide manufacturer's and product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
  - 6. Include account of abbreviations and symbols used in schedule.
- C. Shop Drawings - Electrified Door Hardware: Submit diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
  - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
  - 2. Elevations: Submit front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
  - 3. Diagrams: Submit point-to-point wiring diagram that shows each device in door opening system with related colored wire connections to each device.
- D. Samples for Verification:
  - 1. Submit minimum size of 2 by 4 inch for sheet samples, and minimum length of 4 inch for other products.
  - 2. Submit one (1) sample of hinge, latchset, lockset, and closer illustrating style, color, and finish.
  - 3. Return full-size samples to be incorporated into this Work.
  - 4. Submit product description with samples.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
  - 1. Submit manufacturer's parts lists and templates.
  - 2. Bitting List: List of combinations as furnished.
- G. Keying Schedule:
  - 1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- H. Manufacturer's qualification statement.
- I. Installer's qualification statement.

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- J. Supplier's qualification statement.
- K. District Responsibilities for submittal review:
  - 1. Complete keying schedule.
  - 2. Complete keying legend.
  - 3. Provide original letter of authorization allowing hardware supplier to purchase keying hardware and to have the bitting list sent to District.
  - 4. Provide District the locksmith's name, address, phone number and email.
  - 5. Identify how doors are to be keyed.
  - 6. For existing systems, provide the registry number.
- L. Manufacturers' certificates that fire-rated hardware meets or exceeds specified requirements.
- M. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in District's name and registered with manufacturer.
- N. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
  - 1. Include keying schedule, riser and point-to-point wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report
- O. Maintenance Materials and Tools: Furnish the following for District's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Lock Cylinders: Ten for each master keyed group.
  - 3. Temporary Cores: Return to and receipt by Contractor.
  - 4. Tools: Two sets of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

**1.06 QUALITY ASSURANCE**

- A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.
- D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

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**1.08 PROJECT CONDITIONS AND COORDINATION:**

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect’s approval.
- B. Coordination:
  - 1. Coordinate hardware with other work.
  - 2. Provide hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
  - 3. Furnish related trades with the following information:
    - a. Location of embedded and attached items to concrete.
    - b. Location of wall-mounted hardware, including wall stops.
    - c. Location of finish floor materials and floor-mounted hardware.
    - d. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items.
      - 1) Fire/life-safety system interfacing.
      - 2) Point-to-point wiring diagrams plus riser diagrams to related trades.
    - e. Coordinate: flush top rails of doors at outswinging exteriors, and throughout where adhesive-mounted seals occur.
    - f. Manufacturers’ templates to door and frame fabricators.
- C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.

**1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
  - 1. Mechanical Closers: Thirty years, minimum.
  - 2. Electrical Closers: As indicated, minimum.
  - 3. Mechanical Exit Devices: Three years, minimum.
  - 4. Electrical Exit Devices: One year, minimum.
  - 5. Locksets and Cylinders: Three years, minimum.
  - 6. Other Hardware: Two years, minimum.

**PART 2 PRODUCTS**

**2.01 DESIGN AND PERFORMANCE CRITERIA**

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

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- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Regulatory Requirements:
  - 1. Comply with State Fire Marshal Standards.
    - a. Lever of lever actuated latches or locks shall be curved with a return to within 1/2 inch of the door to prevent catching on the clothing of persons during egress. SFM 12-10-2 Latching/Locking, Section 12-10-202(f).
    - b. The cross-bar shall extend across not less than one-half the width of the door/gate. 12-10-3 Exits, Section 12-10-302(a).
    - c. The ends of the cross-bar shall be curved, guarded or otherwise designed to prevent catching on the clothing of persons during egress. SFM 12-10-3 Exits, Section 12-10-302(d).
  - 2. Conform to applicable requirements of the CBC Chapter 11B and ADA Standards regarding accessibility requirements for door and entrance hardware including gates.
    - a. Doors/doorways as part of an accessible route shall comply with CBC Sections 11B-404.
    - b. Doors shall meet California Building Code Sections 11B-206.5, 11b-404.1 and 1010.1.
    - c. The clear opening width for a door shall be 32 inches minimum. CBC Section 11B-404.2.3
      - 1) For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees.
      - 2) There shall be no projections into it below 34 inches and 4 inches maximum projections into it between 34 inches and 80 inches above the finish floor or ground.
      - 3) Door closers and stops shall be permitted to be 78 inches minimum above the finish floor or ground.
      - 4) Exception: Doors not requiring full passage through the opening, that is, to spaces less than 24 inches in depth, may have the clear opening width reduced to 20 inches. Example: shallow closets.
    - d. Handles, pulls, latches, locks, and other operable parts on accessible doors shall comply with CBC Section 11B-309.4 and shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist.
      - 1) Operable parts of such hardware shall be 34 inches minimum and 44 inches maximum above finish floor or ground.
      - 2) Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both side. CBC Section 11B-404.2.7
    - e. The force for pushing or pulling open a door shall be as follows : CBC Section 11B-404.2.9.
      - 1) Interior Hinged Doors, sliding or folding doors, and exterior hinged doors: 5 lbs maximum.
      - 2) Required Fire Doors: the minimum opening force allowable by the DSA authority, not to exceed 15 lbs..

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- 3) These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.
  - 4) The force required to activate any operable parts, such as retracting latch bolts or disengaging other devices, shall be 5 lbs. maximum to comply with CBC Section 11B-309.4.
- f. Door closing speed shall be as follows: CBC Section 11B-404.2.8
    - 1) Closer shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds minimum.
    - 2) Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.
  - g. Thresholds shall comply with CBC Section 11B-404.2.5.
  - h. Floor stops shall not be located in the path of travel and 4 inches maximum from walls.
  - i. Hardware (including exit devices) shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met.
    - 1) Such hardware has a 'dogging' feature.
    - 2) It is dogged during the time the facility is open.
    - 3) Such 'dogging' operation is performed only by employees as their job function (non-public use).
  - j. Pair of doors: Limit swing of one leaf to 90 degrees so that a clear floor space is provided beyond the arc of the swing for the wall-mounted tactile sign. CBC Section 11B-703.4.2.1
3. Door and door hardware encroachment: when door is swung fully-open into means-of-egress path, the door, including the hardware, may not encroach or project more than 7 inches into the required exit width. California Building Code 1005.7.1.
- D. Provide door hardware products that comply with the following requirements:
- 1. Applicable provisions of federal, state, and local codes.
  - 2. Accessibility: ADA Standards, CBC Chapter 11B.
  - 3. Listed and certified compliant with specified standards by BHMA (CPD).
  - 4. Auxiliary Hardware: BHMA A156.16.
  - 5. Straps and Tee Hinges: BHMA A156.20.
  - 6. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.
- E. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with CEC.
- F. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. See Door Hardware Schedule.

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1. Exit Doors: Openable at all times from the inside without the use of a key or any special knowledge or effort.
- G. Fasteners:
1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
    - a. Aluminum fasteners are not permitted.
    - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
  2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
    - a. Self-drilling (Tek) type screws are not permitted.
  3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.

**2.02 EXIT DEVICES**

- A. Exit Devices: Comply with BHMA A156.3, Grade 1.
1. Lever design to match lockset trim.
  2. Provide cylinder with cylinder dogging or locking trim.
  3. Provide exit devices properly sized for door width and height.
  4. Provide strike as recommended by manufacturer for application indicated.
  5. Releasable in normal operation with 5-lb. maximum operating force per California State CBC Chapter 11B-309.4.
  6. Readily openable from egress side with one hand and without tight grasping, tight pinching, or twisting of the wrist to operate.
  7. Comply with CBC Section 1010.1.9 and State Fire Marshal Standard 12-10-3 Exits, Section 12-10-302.
    - a. Mechanical Method: Von Duprin “AX-“ feature, where touchpad directly retracts the latchbolt with 5 lb or less of force. Provide testing lab certification confirming that the mechanical device is independent third-party tested to meet this 5 lb requirement.
  8. Trim to meet BHMA A156.3 Trim Security Test.
  9. Independent lab-tested 1,000,000 cycles.
  10. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.
  11. For electrical options, provide quick connect plug-in pre-wired connectors.

**2.03 LOCK CYLINDERS**

- A. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
1. Provide standard, electronic, conventional, and full size interchangeable core (FSIC) type cylinders, Grade 1, with six-pin core in compliance with BHMA A156.5 at locations indicated.

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2. Provide cylinders from same manufacturer as locking device.
3. Provide cams and/or tailpieces as required for locking devices.
4. Furnish keyed at factory of lock manufacturer where permanent records are maintained.
5. Locks and cylinders by the same manufacturer.
6. Within specific Door Sections, when provisions for lock cylinder are being referenced to this Section, provide specified lock cylinder and keyed to building keying system, unless otherwise indicated.

**2.04 HYDRAULIC GATE CLOSER AND HINGE**

- A. Basis of Design Product: Mammoth 180 with Dino hinge as manufactured by Loconix, or approved equal.
- B. Self Closing Hinges: Comply with BHMA A156.17.
- C. Description:
  1. 100% mechanical (no electronic components).
  2. Closing Speed: Adjusting a valve with an Allen key.
  3. Closing Force: Adjustable to maximum 5 lbs operating force. Comply with ADA Standards and CBC Ch. 11B.
  4. Allow for a 180 degrees opening angle of the gate.
    - a. When opened 180 degrees, the gate closer should self-close over the 180 degrees.
  5. Include corresponding bottom hinge.
  6. Dampening Mechanism: Hydraulic .
  7. The gate closer should have double rubber sealings to avoid oil leakage at all times.
  8. Color: Black or silver color, as selected by Architect.
- D. Performance
  1. The gate closer shall be specifically made for outdoor use (IP69).
  2. Gates up to 330 lbs and gate width up to 5 feet.
  3. The opening pressure of the gate closer shall be between 3 and 5 lbs. maximum over the full 180 degrees.
  4. Guarantee the hydraulic dampening to work properly under all temperature circumstances without any summer or winter adjustments, measured at a 90° opening. The viscosity of the oil shall have no impact on the performance of the gate closer.
    - a. The closing time shall not be below 10 seconds at 70 degrees Celsius (summer).
    - b. The closing time shall not be longer than 30 seconds at -30 degrees Celsius (winter).
  5. Tested for 500,000 movements.
  6. Maintenance free (no greasing nor oil refill).
  7. Manufacturer Warranty: 3 years.

**2.05 PADLOCKS**

- A. Padlocks: Solid extruded brass case with shackle that locks at heel and toe.

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1. Shackle Height: 3/4 inch, and width of opening is 7/8 inch.
2. Shackle Diameter: 1/4 inch.

**2.06 SIGNAGE**

- A. See Section 10 14 00 for additional signage requirements.

**2.07 KEY CONTROL SYSTEMS**

- A. Key Control Systems: Comply with guidelines of BHMA A156.28.
  1. Provide keying information in compliance with DHI (KSN) standards.
  2. Keying: Grand master keyed.
  3. Include construction keying and control keying with removable core cylinders.
    - a. Provide temporary keyed-alike cores.
    - b. Remove at substantial completion and install permanent cylinders/cores in District's presence.
      - 1) Demonstrate that construction key no longer operates.
  4. Key to existing keying system.
    - a. Factory registered master key system.
    - b. Restricted keyway, interchangeable core.
    - c. Contact District Locksmith with for keying requirements.
    - d. Key blanks available only from factory-direct sources, not available from after-market key blank manufacturers.
    - e. For estimate use factory GMK charge.
    - f. Furnish District's written approval of the system.
  5. Supply keys in following quantities:
    - a. 4 each Master keys.
    - b. 6 each Construction Master keys.
    - c. 15 each Construction keys.
    - d. 2 each Construction Control keys.
    - e. 2 each Control keys if new system.
    - f. 2 each Extra Cylinder cores.
    - g. 2 each Change keys for each keyed core.
  6. Key Management System: For each keyed lock on project, provide one set of consecutively numbered duplicate key tags with hanging hole and snap catch.
  7. Security Key Tags: For each keyed lock on project, provide one set of matching key tags for permanent attachment to one key of each set.
  8. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
  9. Deliver keys with identifying tags to District by security shipment direct from hardware supplier.

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10. Bitting List: Use secured shipment direct from point of origination to District upon completion.
11. Permanent Keys and Cores: Stamped with applicable key marking for identification. Do not include actual key cuts within visual key control marks or codes. Stamp permanent keys "Do Not Duplicate."

**2.08 FIRE DEPARTMENT LOCK BOX**

- A. Manufacturers:
  1. Basis of Design: Knox Company.
  2. Knox Company; Knox-Box Rapid Entry System; Model 3227: [www.knoxbox.com](http://www.knoxbox.com).
  3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Fire Department Lock Box: at Buildings or Site Walls
  1. Heavy-duty, recessed, solid stainless-steel box with hinged door and interior gasket seal; single drill resistant lock with dust covers and tamper alarm.
  2. Capacity: Holds 10 keys.
  3. Finish: Manufacturer's standard dark bronze.
  4. Mounted to posts at manual gates (for driveways/roads) and as indicated on Drawings:
    - a. Key lock boxes shall be located at driver's side of gate entrance in a visible location as directed by Fire Department.
      - 1) Box shall be welded secure to metal posts. Box shall be 4 to 4-1/2 feet from top of box to finished grade.
    - b. Obtain approval from Fire Department of mounting location/position and operating standards before installation.
    - c. Products:
      - 1) Knox Company; Model 3208 or 3166, as applicable.
      - 2) Knox Decal 1001 shall be placed on gate.
      - 3) Substitutions: See Section 01 60 00 - Product Requirements. Only if allowed or required by local Fire Department.
- C. Provide Knox Fire Department alert decals on all exterior doors of the facility and on all interior doors that keys have been furnished for within the lock box.
  1. If the building/facility is protected with a fire alarm system or burglar alarm system, the lock boxes shall be "tamper" monitoring.
  2. The tamper monitoring must include the following:
    - a. All central stations shall be UL listed.
    - b. For combination Fire/Burglar Alarm Panels, the Knox Box monitoring shall be through the fire side of the panel.
    - c. Central stations upon receiving a Knox Box tamper alarm signal shall:
      - 1) Notify and respond to local Police Department (Knox Box tamper).
      - 2) Notify and respond to the local Fire Department (Knox Box tamper).

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**2.09 POWER SUPPLY**

- A. Power Supply: Hard wired, with multiple zones providing eight (8) breakers for each output panel with individual control switches and LED's; UL (DIR) Class 2 listed.
  - 1. Power: 24 VAC, 10 Amp; with 120 VAC power supply.
  - 2. Operating Temperature: 32 to 110 degrees F.
  - 3. Provide with emergency release terminals that release devices upon activation of fire alarm system.

**2.10 FINISHES**

- A. Finishes: Identified in Section 08 0671 - Door Hardware Schedule.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of correct characteristics.

**3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
  - 1. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
  - 2. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
    - a. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
    - b. Replace fasteners damaged by power-driven tools.
- B. Use templates provided by hardware item manufacturer.
- C. Do not install surface mounted items until application of finishes to substrate are fully completed.
- D. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
  - 1. Comply with California Building Code, Section 1010.1.9.2, 11B-309.4 and 11B-404.2.7.
    - a. Refer also to CBC requirements noted in Part 1 of this section.
  - 2. Mounting heights in compliance with ADA Standards and CBC Chapter 11B:
    - a. Exit Devices: 36 (clear) to 44 inches.
    - b. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware when compliant with codes.

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**3.03 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing under provisions of Section 01 40 00 - Quality Requirements.
- B. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

**3.04 ADJUSTING**

- A. Adjust work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
  - 1. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
    - a. Hardware damaged by improper installation or adjustment methods: repair or replace to District's satisfaction.
    - b. Adjust doors to fully latch with no more than 1 pound of pressure.
    - c. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
    - d. Adjust door closers per "Commissioning" article below.
- C. Final inspection: Installer to provide letter to District that upon completion installer has visited the Project and has accomplished the following:
  - 1. Has re-adjusted hardware.
  - 2. Has evaluated maintenance procedures and recommend changes or additions, and instructed District's personnel.
  - 3. Has identified items that have deteriorated or failed.
  - 4. Has submitted written report identifying problems.

**3.05 COMMISSIONING:**

- A. Conduct these tests prior to request for certificate of substantial completion:
  - 1. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
  - 2. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.
  - 3. With installer present, test door hardware operation for compliance with push and pull force requirements per ADA and CBC.

**3.06 CLEANING**

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

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- D. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

**3.07 PROTECTION**

- A. Protect finished Work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

**3.08 CLOSEOUT**

- A. Return of temporary cores for return/receipt by Contractor.
- B. Final inspection: Installer to provide letter to District that upon completion installer has visited the Project and has accomplished the following:
  - 1. Has re-adjusted hardware.
  - 2. Has evaluated maintenance procedures and recommend changes or additions, and instructed District's personnel.
  - 3. Has identified items that have deteriorated or failed.
  - 4. Has submitted written report identifying problems.

**3.09 SCHEDULE OF FINISH HARDWARE**

- A. See door schedule in drawings for hardware set assignments.
- B. No hardware shall be ordered until Finish Hardware has been reviewed and approved by Architect's hardware consultant.
- C. Provide Factory order numbers for all products supplied on this project as part of close out documents for Owner's warranty records.
- D. See schedule in Section 08 06 71 - Door Hardware Schedule.

**END OF SECTION**

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**SECTION 09 05 61  
COMMON WORK RESULTS FOR FLOORING PREPARATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
  - 1. Resilient tile and sheet.
  - 2. Fluid-Applied flooring.
- B. Removal of existing floor coverings.
- C. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- D. Testing of concrete floor slabs for moisture and alkalinity (pH).
- E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
  - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- F. Patching compound.
- G. Remedial floor coatings.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 40 00 - Quality Requirements: Additional requirements relating to testing agencies and testing.
- B. Section 01 74 19 - Construction Waste Management and Disposal: Handling of existing floor coverings removed.
- C. Section 03 30 00 - Cast-in-Place Concrete: Moisture emission reducing curing and sealing compound for slabs to receive adhered flooring, to prevent moisture content-related flooring failures; to remain in place, not to be removed.
- D. Section 03 30 00 - Cast-in-Place Concrete: Concrete admixture for slabs to receive adhered flooring, to prevent moisture content-related flooring failures.
- E. Section 03 30 00 - Cast-in-Place Concrete: Limitations on curing requirements for new concrete floor slabs.

**1.03 REFERENCE STANDARDS**

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

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- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

**1.05 SUBMITTALS**

- A. Visual Observation Report: For existing floor coverings to be removed.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Moisture and alkalinity (pH) limits and test methods.
  - 2. Manufacturer's required bond/compatibility test procedure.
- C. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
  - 1. Manufacturer's qualification statement.
  - 2. Manufacturer's statement of compatibility with types of flooring applied over remedial product.
  - 3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
  - 4. Manufacturer's installation instructions.
  - 5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- D. Testing Agency's Report:
  - 1. Description of areas tested; include floor plans and photographs if helpful.
  - 2. Summary of conditions encountered.
  - 3. Moisture and alkalinity (pH) test reports.
  - 4. Copies of specified test methods.
  - 5. Recommendations for remediation of unsatisfactory surfaces.
  - 6. Include certification of accuracy by authorized official of testing agency.
  - 7. Submit report directly to District.
  - 8. Submit report not more than two business days after conclusion of testing.
- E. Adhesive Bond and Compatibility Test Report.
- F. Floor Moisture Testing Technician Certificate: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician- Grade I certificate.
- G. Copy of RFCI (RWP).

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**1.06 QUALITY ASSURANCE**

- A. Moisture and alkalinity (pH) testing will be performed by an independent testing agency employed and paid by District.
- B. Contractor may perform additional adhesive and bond test with Contractor's own personnel or hire a testing agency.
- C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
  - 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project District's project contact information.
- D. Contractor's Responsibility Relating to Independent Agency Testing:
  - 1. Provide access for and cooperate with testing agency.
  - 2. Confirm date of start of testing at least 10 days prior to actual start.
  - 3. Allow at least 4 business days on site for testing agency activities.
  - 4. Achieve and maintain specified ambient conditions.
  - 5. Notify District when specified ambient conditions have been achieved and when testing will start.
- E. Floor Moisture Testing Technician Qualifications: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician Certification- Grade I.
- F. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

**1.08 FIELD CONDITIONS**

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following

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characteristics:

1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
  2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
  3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
  4. Products:
    - a. ARDEX Engineered Cements, Inc; ARDEX K-15: [www.ardexamericas.com](http://www.ardexamericas.com).
    - b. H.B. Fuller Construction Products, Inc; TEC Feather Edge Skim Coat: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
    - c. Mapei International; Mapei Ultraplan 1 Plus: [www.mapei.com](http://www.mapei.com).
    - d. Sika Corporation; Sika Level-315: [www.sikafloorusa.com](http://www.sikafloorusa.com).
    - e. USG Corporation; Durock Brand Advanced Skim Coat Floor Patch: [www.usg.com/#sle](http://www.usg.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
  2. Products:
    - a. ARDEX Engineered Cements; Ardex MC ULTRA with ARDEX FEATHERFINISH: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; TechMVC Moisture Vapor and Alkalinity Barrier: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - c. Floor Seal Technology, Inc; MES 100 with Floor Seal FloorCem SLU: [www.floorseal.com/#sle](http://www.floorseal.com/#sle).
    - d. Koster American Corporation; Koster VAP I 2000 with Koster SL Premium overlay: [www.kosterusa.com/#sle](http://www.kosterusa.com/#sle).
    - e. LATICRETE International, Inc; LATICRETE NXT Vapor Reduction Coating with LATICRETE NXT Level Plus: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - f. LATICRETE International, Inc; LATICRETE SUPERCAP Moisture Vapor Control with LATICRETE SUPERCAP Underlayment: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - g. Maxxon Corporation; Aquafin SG4: [www.maxxon.com/#sle](http://www.maxxon.com/#sle).

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- h. Sika Corporation; Sikafloor Moisture Tolerance Epoxy Primer and Sikafloor Self-Leveling Moisture Tolerant Resurfacer: [www.sikafloorusa.com/#sle](http://www.sikafloorusa.com/#sle).
- i. Tnemec Company, Inc; Series 208 Epoxoprime MVT: [www.tnemec.com/#sle](http://www.tnemec.com/#sle).
- j. USG Corporation; Durock Brand CST Moisture Vapor Reducer: [www.usg.com/#sle](http://www.usg.com/#sle).
- k. Substitutions: See Section 01 60 00 - Product Requirements.

**PART 3 EXECUTION**

**3.01 CONCRETE SLAB PREPARATION**

- A. Follow recommendations of testing agency.
- B. Perform following operations in the order indicated:
  - 1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
    - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
    - b. Removal of existing floor covering.
  - 2. Existing concrete slabs with coatings or penetrating sealers/hardeners/dustproofers:
    - a. Do not attempt to remove coating or penetrating material.
    - b. Do not abrade surface.
  - 3. Preliminary cleaning.
  - 4. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
  - 5. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 6. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 7. Specified remediation, if required.
  - 8. Patching, smoothing, and leveling, as required.
  - 9. Other preparation specified.
  - 10. Adhesive bond and compatibility test.
  - 11. Protection.
- C. Remediations:
  - 1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
  - 2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
  - 3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to

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the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

**3.02 REMOVAL OF EXISTING FLOOR COVERINGS**

- A. Comply with local, State, and federal regulations and recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

**3.03 PRELIMINARY CLEANING**

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

**3.04 MOISTURE VAPOR EMISSION TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

**3.05 INTERNAL RELATIVE HUMIDITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F. Report: Report the information required by the test method.

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**3.06 ALKALINITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
  - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
  - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
  - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

**3.07 PREPARATION**

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with recommendations of testing agency.
- C. Comply with requirements and recommendations of floor covering manufacturer.
- D. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- E. Do not fill expansion joints, isolation joints, or other moving joints.

**3.08 ADHESIVE BOND AND COMPATIBILITY TESTING**

- A. Comply with requirements and recommendations of floor covering manufacturer.

**3.09 APPLICATION OF REMEDIAL FLOOR COATING**

- A. Comply with requirements and recommendations of coating manufacturer.
- B. Install remedial coating over all concrete floor areas where moisture emission and/or alkalinity exceeds the floor covering manufacturer's published limits.
- C. Prepare floor areas to be coated in accordance with coating manufacturer's requirements.
  - 1. Mask and protect adjacent wall and floor surfaces from damage due to this work.
- D. Apply coating using manufacturer's recommended procedures.
- E. Apply 1/8 inch thick cementitious surfacing over coating in areas to receive adhesively applied floor coverings.
- F. Verify that prepared floor slab has moisture emission rate and alkalinity meeting requirements.

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**3.10 PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

**END OF SECTION**

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**SECTION 09 67 00  
FLUID-APPLIED FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fluid-applied flooring and base.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 07 92 00 - Joint Sealants: Sealing joints between fluid-applied flooring and adjacent construction and fixtures.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- D. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ANSI/ESD STM7.1 - Standard Test Method for the Protection of Electrostatic Discharge Susceptible Items - Floor Materials - Resistive Characterization of Materials.
- C. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- C. Samples: Submit two samples, 8 by 8 inch in size illustrating color and pattern for each floor material for each color specified.
- D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.
- F. Applicator's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.
- H. Maintenance Materials: Furnish the following for District's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Top Coat Materials: 2 gallons.

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**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section.
  - 1. Minimum three years of documented experience.
  - 2. Approved by manufacturer.
- C. Supervisor Qualifications: Trained by product manufacturer.

**1.06 MOCK-UP**

- A. Construct mock-up(s) of fluid applied flooring to serve as basis for evaluation of texture and workmanship.
  - 1. Number of Mock-Ups to be Prepared: One.
  - 2. Use same materials and methods for use in the work.
  - 3. Use approved design samples as basis for mock-ups.
  - 4. Locate where directed.
  - 5. Minimum Size: 48 inches by 48 inches.
- B. Obtain approval of mock-up by Architect before proceeding with work.
- C. Approved mock-up may remain as part of the Work.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store resin materials in a dry, secure area.

**1.08 FIELD CONDITIONS**

- A. Maintain minimum temperature in storage area of 55 degrees F.
- B. Store materials in area of installation for minimum period of 24 hours prior to installation.
- C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

- A. All products used shall meet VOC requirements listed in Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Requirements for Physically Disabled: Provide flooring meeting slip-resistant requirements of California Code of Regulations (CCR), Title 24, Part 2, Chapter 11B and ADA Standards, latest amendment.
  - 1. Flooring surface shall be stable, firm, and slip resistant. CBC Section 11B-302.1 General.
  - 2. Flooring Surface shall demonstrate a dynamic coefficient of friction of at least 0.42 per DCOF AcuTest ANSI 137.1 Section 9.6 and ANSI B101.3 (using a BOT-3000 testing unit) will be accepted as meeting the intent of slip resistance; CBC 11B-302 Floor or Ground Surfaces and ADA Standards.

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- a. Ramp surface: Provide DCOF value of 0.46.

**2.02 FLUID-APPLIED FLOORING SYSTEMS**

- A. Fluid-Applied Flooring Type EP: Epoxy base coat(s) with embedded quartz aggregate.
  - 1. Aggregate: Quartz granules.
  - 2. Top Coat: Polyurethane.
  - 3. System Thickness: 1/8 inch, nominal, dry film thickness (DFT).
  - 4. Texture: Smooth.
  - 5. Sheen: Matte.
  - 6. Flammability (ASTM D635): Self-Extinguishing.
  - 7. Color: As selected by Architect.
  - 8. Products:
    - a. Sherwin-Williams Company; Armorseal Armorquartz 100% Solids Epoxy: [www.protective.sherwin-williams.com/#sle](http://www.protective.sherwin-williams.com/#sle).
    - b. Sherwin-Williams Company; General Polymers Brand: [www.generalpolymers.com](http://www.generalpolymers.com).
    - c. Sika Corporation; Sikafloor Quartzite Broadcast System: [www.sikafloorusa.com/#sle](http://www.sikafloorusa.com/#sle).
    - d. Stonhard; Stonshield SLT: [www.stonhard.com/#sle](http://www.stonhard.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.

**2.03 ACCESSORIES**

- A. Fillet Strips: Molded of flooring resin material.
- B. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.
- C. Primer: Type recommended by fluid-applied flooring manufacturer.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Verify that required floor-mounted utilities are in correct location.

**3.02 PREPARATION**

- A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.

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- C. Vacuum clean substrate.
- D. Apply primer to surfaces required by flooring manufacturer.

**3.03 INSTALLATION - ACCESSORIES**

- A. Install access panel recess frames.
- B. Install fillet strips at base of walls where flooring is to be extended up wall as base.

**3.04 INSTALLATION - FLOORING**

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness required by manufacturer.
- C. Finish to smooth level surface.
- D. Cove at vertical surfaces.

**3.05 FIELD QUALITY CONTROL**

- A. Test installed floor surface in accordance with ANSI/ESD STM7.1 .

**3.06 PROTECTION**

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Barricade area to protect flooring until fully cured.

**END OF SECTION**

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**SECTION 09 96 00  
HIGH-PERFORMANCE COATINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. High performance coatings.
  - 1. Exterior Steel: exterior steel, hollow metal doors and frames, guardrails/handrails, and metal copings/flashings (not prefinished)
- B. Surface preparation.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 91 13 - Exterior Painting.
- C. Section 09 67 00 - Fluid-Applied Flooring: High performance fluid-applied flooring systems.

**1.03 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D2486 - Standard Test Methods for Scrub Resistance of Wall Paints.
- C. ASTM D4587 - Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings.
- D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board.
- E. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association.
- F. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.
- G. SCAQMD 1113 - Architectural Coatings.
- H. SSPC-SP 1 - Solvent Cleaning.
- I. SSPC-SP 6 - Commercial Blast Cleaning.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section; require attendance by all affected installers.
  - 1. Require attendance of parties directly affecting work of this section, including Contractor, Architect, applicator, and manufacturer's representative. Review the following:
    - a. Environmental requirements.
    - b. Protection of surfaces not scheduled to be coated.
    - c. Surface preparation.

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- d. Application.
- e. Repair.
- f. Field quality control.
- g. Cleaning.
- h. Protection of coating systems.
- i. One-year inspection.
- j. Coordination with other work.

**1.05 SUBMITTALS**

- A. Product Data: Provide complete list of all products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
  - 4. Manufacturer's installation instructions.
  - 5. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.
- B. Samples: Submit two samples 8 by 8 inch in size illustrating colors available for selection.
- C. Manufacturer's Certificate: Certify that high-performance coatings comply with VOC limits specified.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Data: Include cleaning procedures and repair and patching techniques.
  - 1. Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and coated surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for District's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Coating Materials: 1 gallon of each type and color.
  - 3. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

**1.06 QUALITY ASSURANCE**

- A. Maintain one copy of each referenced document that applies to application on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

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- C. Applicator Qualifications: Company specializing in performing the work of this section approved by manufacturer.

**1.07 MOCK-UPS**

- A. Provide mock-up , 8 feet long by 8 feet wide (or otherwise appropriate), illustrating coating, for each specified coating.
- B. Locate where directed.
- C. Mock-up may remain as part of the work.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Coating Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

**1.09 FIELD CONDITIONS**

- A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.
- C. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.
- D. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
- F. Restrict traffic from area where coating is being applied or is curing.

**1.10 WARRANTY**

- A. Correct defective Work within a five year period after Date of Substantial Completion.
- B. Warranty: Include coverage for bond to substrate.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Provide high performance coating products from the same manufacturer to the greatest extent possible.
  - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
  - 2. Substitution of other products by the same manufacturer is preferred over substitution of products by a different manufacturer.

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- B. High-Performance Coatings:
  - 1. Carboline: [www.carboline.com](http://www.carboline.com).
  - 2. Dunn Edwards : [www.dunnedwards.com](http://www.dunnedwards.com).
  - 3. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
    - a. Local representative Susan L. Giampietro 949.410.2452.
  - 4. Sherwin-Williams Company: [www.protective.sherwin-williams.com/industries/#sle](http://www.protective.sherwin-williams.com/industries/#sle).
    - a. Local Representative: John Dumesnil, 619.665.9341.
  - 5. Tnemec Company, Inc: [www.tnemec.com/#sle](http://www.tnemec.com/#sle).
    - a. Local Representative: Tony Hobbs, 310.637.2363.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.

**2.02 HIGH-PERFORMANCE COATINGS**

- A. Provide coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:
  - 1. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0, maximum, when tested in accordance with ASTM E84.
  - 2. Lead Content: None.
  - 3. Scrubbability: Excellent, when tested in accordance with ASTM D2486.
  - 4. Gloss and Color Retention: Excellent, when tested in accordance with ASTM D4587.
- B. Moderate Exposure: All minimum criteria, plus:
  - 1. Pool Chemicals.

**2.03 TOP COAT MATERIALS**

- A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
  - 1. Lead Content: Not greater than 0.06 percent by weight of total nonvolatile content.
  - 2. Chromium Content, as Hexavalent Chromium, Zinc Chromate, or Strontium Chromate: None.
  - 3. Volatile Organic Compound (VOC) Content: See Section 01 61 16.
  - 4. Volatile Organic Compound (VOC) Content:
    - a. Provide coatings that comply with the most stringent requirements specified in the following:
      - 1) 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      - 2) SCAQMD 1113 Rule.
      - 3) CARB (SCM).
      - 4) Architectural coatings VOC limits of California.

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- b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
    - 5. Colors: As indicated.
  - B. Urethane Coating:
    - 1. Number of Coats: Two.
    - 2. Product Characteristics:
      - a. Comply with the performance requirements specified above for moderate exposure.
    - 3. Top Coat(s): Acrylic Urethane, Water Based, Two-Component.
      - a. Sheen: High Gloss.
      - b. Products:
        - 1) Sherwin-Williams; Pro Industrial Waterbased Acrolon 100: [www.protective.sherwin-williams.com/#sle](http://www.protective.sherwin-williams.com/#sle).
        - 2) Dunn Edwards; Endura-Coat ENCT60: [www.dunnedwards.com](http://www.dunnedwards.com).
        - 3) Benjamin Moore; Ultra Spec HP D.T.M. Acrylic Gloss HP28: [www.benjaminmoore.com](http://www.benjaminmoore.com).
        - 4) Tnemec Company, Inc; Series 1080 Endurashield: [www.tnemec.com/#sle](http://www.tnemec.com/#sle).
        - 5) Substitutions: Section 01 60 00 - Product Requirements.
    - 4. Primer: As recommended by coating manufacturer for specific substrate.

**2.04 PRIMERS**

- A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.
  - 1. Rust-Inhibitive, Water Based; MPI #107.
    - a. Products:
      - 1) Benjamin Moore; Ultra Spec HP Acrylic Metal Primer HP04: [www.benjaminmoore.com](http://www.benjaminmoore.com).
      - 2) Dunn Edwards; EnduraPrime ENPR00: [www.dunnedwards.com](http://www.dunnedwards.com).
      - 3) Sherwin-Williams; Pro Industrial Pro-Cryl Universal Primer: [www.protective.sherwin-williams.com/#sle](http://www.protective.sherwin-williams.com/#sle). (MPI #107)
      - 4) Tnemec Company, Inc; Series 115 Uni-Bond DF: [www.tnemec.com/#sle](http://www.tnemec.com/#sle).
      - 5) Substitutions: Section 01 60 00 - Product Requirements.

**2.05 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

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## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Do not begin application of coatings until substrates have been properly prepared.
- C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- F. Test shop-applied primer for compatibility with subsequent cover materials.
- G. Proceed with coating application only after unacceptable conditions have been corrected.
  - 1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

### **3.02 PREPARATION**

- A. Clean surfaces of loose foreign matter.
- B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.
- C. Remove finish hardware, fixture covers, and accessories and store.
- D. Galvanized Surfaces:
  - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  - 2. Prepare surface according to SSPC-SP 2.
- E. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
  - 3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning", and protect from corrosion until coated.
- F. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

### **3.03 PRIMING**

- A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

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**3.04 COATING APPLICATION**

- A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in MPI - Architectural Painting and Specification Manual.
- B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

**3.05 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements for general requirements for field inspection.
- B. District will provide field inspection.
- C. Dry Film Thickness Testing: District will engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.

**3.06 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

**3.07 PROTECTION**

- A. Protect finished work from damage.

**END OF SECTION**

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**SECTION 10 14 00  
SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Room and door signs.
- B. Emergency evacuation maps.

**1.02 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- C. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  - 1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
  - 2. When content of signs is indicated to be determined later, request such information from District through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
  - 3. Submit for approval by District through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Verification Samples: Submit samples showing colors specified.
- G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- H. Manufacturer's Qualification Statement.
- I. Maintenance Materials: Furnish the following for District's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

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**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

**1.06 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Flat Signs:
  - 1. ASI Sign Systems, Inc.: [www.asisignage.com](http://www.asisignage.com).
  - 2. Best Sign Systems, Inc: [www.bestsigns.com](http://www.bestsigns.com).
  - 3. Cosco Industries (ADA signs): [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
  - 4. Cosco Industries (non-ADA signs): [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
  - 5. FASTSIGNS: [www.fastsigns.com/#sle](http://www.fastsigns.com/#sle).
  - 6. Inpro: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 7. Mohawk Sign Systems, Inc: [www.mohawksign.com](http://www.mohawksign.com).
  - 8. Seton Identification Products: [www.seton.com/aec](http://www.seton.com/aec).
  - 9. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
  - 1. Requirements for Persons with Disabilities: Provide identifying devices meeting the requirements for the physically disabled of the following codes:
    - a. California Building Code (CBC) Title 24, Part 2; Chapter 11B, Accessibility.
    - b. Code of Federal Regulations 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.
    - c. Accessible Means of Egress Signage: CBC 1009.
      - 1) Two-Way Communications Signage: CBC 1009.8

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- (a) Provide at the landing of each elevator or bank of elevators on each accessible floor, one or more stories above or below the level of exit discharge. Coordinate content with system provider. CBC 1009.11
- 2) When included, provide Area of Refuge Signage indicating special accessibility provisions as shown: CBC 1009.9
  - (a) Each door providing access to an area of refuge from an adjacent floor area shall be identified by a sign stating: AREA OF REFUGE.
  - (b) Each door providing access to an exterior area for assisted rescue shall be identified by a sign stating: EXTERIOR AREA FOR ASSISTED RESCUE.
  - (c) Comply with Chapter 11B, Section 11B-703.5, as applicable, requirements for visual characters and include the International Symbol of Accessibility.
  - (d) Where exit sign illumination is required by Section 1013.3, the **signs shall be illuminated**.
  - (e) Locate at each door to an area of refuge and exterior area for assisted rescue in accordance with Section 1013.4, signage with visual characters, raised character and braille complying with Chapter 11B, Sections 11B-703.1, 11B-703.2, 11B-703.3 and 11B-703.5.
  - (f) Provide International Symbol of Accessibility to comply with Chapter 11B, Section 11B-703.
- 3) Directional Signage: CBC 1009.10.
  - (a) Provide directional signage complying with Chapter 11B, Section 11B-703.5 indicating the location of all other means of egress and which are accessible means of egress:
    - (1) At exits serving a required accessible space but not providing an approved accessible means of egress.
    - (2) At elevator landings.
    - (3) Within areas of refuge.
- 2. Raised characters shall comply with CBC 11B-703.2.
  - a. Depth: It shall be 1/32 inch minimum above their background and shall be sans serif uppercase and be duplicated in Braille.
  - b. Height: It shall be 5/8 inch minimum and 2 inches maximum based on the height of the uppercase letter "I". CBC Section 11B-703.2.5
  - c. Finish and contrast: Characters and their background shall have a non-glare finish. Character shall contrast with their background with either light characters on a dark background or dark characters on a light background. CBC Section 11B-703.5.1
  - d. Proportions: It shall be selected from fonts where the width of the uppercase letter "O" is 60 % minimum and 110 % maximum of the height of the uppercase letter "I". Stroke thickness of the uppercase letter "I" shall be 15% maximum of the height of the character. CBC Sections 11B-703.2.4 and 11B-703.2.6; If characters are both visual and raised, provide stroke width min. 10% and max. 15% of the character "I".
  - e. Character Spacing: Spacing between individual tactile characters shall comply with CBC Section 11B-703.2.7.

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- 1) 11B-703.2.8 Line spacing. Spacing between the baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.
  - f. Format: Text shall be in a horizontal format. CBC 11B-703.2.9.
  - g. Braille: It shall be contracted (Grade 2) and shall comply with CBC Sections 11B-703.3 and 11B-703.4. Braille dots shall have a domed and rounded shape and shall comply with CBC Table and Figure 11B-703.3.1.
  - h. Mounting height: Tactile sign on signs shall be located 48 inches minimum to the baseline of the lowest Braille cells and 60 inches maximum to the baseline of the highest line of raised characters above the finish floor or ground surface. CBC Section and Figure 11B-703.4.1.
  - i. Mounting location: A tactile sign shall be located per CBC Section and Figure 11B-703.4.2 as follows:
    - 1) alongside a single door on the latch side.
    - 2) on the inactive leaf of a double door with one active leaf.
    - 3) to the right of the right hand door at double doors with two active leaves.
    - 4) on the nearest adjacent wall where there is no wall space at the latch side of a single door or at the right side of double doors with two active leaves.
    - 5) so that a clear floor space of 18 x 18 inch minimum, centered on the tactile characters, is beyond the arc of any door swing between the closed position and 45 degree open position.
  - j. Visual characters shall comply with CBC Section 11B-703.5 and shall be 40 inches minimum above finish floor or ground.
    - 1) Visual character stroke thickness of the uppercase letter "I" shall be 10 % minimum and 20% maximum of the height of the character. CBC Section 11B-703.5.7
  - k. Pictograms shall comply with CBC Section 11B-703.6.
  - l. Symbol of accessibility shall comply with CBC Section 11B-703. 7.
  - m. Variable message signs shall comply with CBC Section 11B-703.8.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
- 1. Sign Type: Flat signs with injection molded or etched panel media as specified.
  - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
  - 3. Character Height: 1 inch.
  - 4. Sign Height: 3 inches, unless otherwise indicated.
  - 5. Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings.
  - 6. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
  - 7. Exits: Provide raised character and Braille exit signs per CBC Section 1013.4 at the following locations:

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<u>Location</u>	<u>Text</u>
Grade level exit door	EXIT

- C. Interior Directional and Informational Signs:
  - 1. Sign Type: Same as room and door signs.
  - 2. Sizes: As indicated on drawings.
  - 3. Wording of signs is scheduled on drawings.
    - a. Occupancy Limits.
    - b. Assistive Listening Devices, include International Symbol of Access for Hearing Loss complying with CBC Figure 11B-703.7.2.4..
- D. Emergency Evacuation Maps:
  - 1. Allow for one map per building.
  - 2. Map content to be provided by District.
  - 3. Use clear plastic panel silk-screened on reverse, in brushed aluminum frame, screw-mounted.

**2.03 SIGN TYPES**

- 1. Edges: Square.
- 2. Corners: Square.
- 3. Wall Mounting of One-Sided Signs: Tape adhesive.
  - a. Provide visually matching back plate when mounted on a glass surface.
- B. Color and Font: Unless otherwise indicated:
  - 1. Character Font: Helvetica, Arial, or other sans serif font.
  - 2. Character Case: Upper case only.
  - 3. Background Color: As scheduled.
  - 4. Character Color: Contrasting color.

**2.04 TACTILE SIGNAGE MEDIA**

- A. Engraved Panels: Laminated colored plastic; engraved or photopolymer etched through face to expose core as background color:
  - 1. Interior Basis of Design Product: InTouch™ ADA-Ready™ Sign System with requirements indicated for materials, thickness, finish colors, designs, shapes, sizes and details as manufactured by ASI Sign Systems, Inc., or approved equal.
  - 2. Total Thickness: 1/8 inch, matte finished acrylic.
  - 3. Fabrication:
    - a. Tactile Graphics and Text:
      - 1) Fabrication process: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque first surface by manufacturer’s photopolymer bonded process. Sign face of single material, tactile characters and Braille integral to photopolymer. Adhesive-fixed characters are not acceptable.

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- 2) Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors. Tactile characters to be raised min. 1/32 inch from surface. Computerized translation of sign copy to be responsibility of the manufacturer.
  - b. Letter style[s], color[s], letter size[s] and layout position:
    - 1) As selected by Architect from manufacturer's standard letter style and color charts.
  - c. Text Schedule: As indicated on Drawings.
  - d. Tactile Lettering and Graphics Color Options: As selected by Architect from manufacturer's standard colors.
  - e. Mounting Panel Options:
    - 1) Size:
      - (a) Same size.
  - f. Background Appearance Options:
    - 1) Solid color[s]: As selected by Architect from manufacturer's standard colors.
    - 2) Subsurface custom graphics.
  - g. Overall panel size: As indicated on Drawings.
  - h. Shape: As indicated on Drawings.
- B. Etched Metal Panels: Zinc based panel etched through face to expose core as background color:
- 1. Exterior Basis of Design Product: SignEtch™ ADA-Ready™ Sign System with requirements indicated for materials, thickness, finish colors, designs, shapes, sizes and details as manufactured by ASI Sign Systems, Inc., or approved equal.
  - 2. Total Thickness: 1/8 inch.
  - 3. Paint: Primer and urethane based color coat, of type standard with manufacturer.
    - a. U.V. resistant clear urethane top coat required for exterior applications.
  - 4. Fabrication:
    - a. Tactile Graphics and Text:
      - 1) Fabrication process: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque first surface by manufacturer's photochemical etching.
      - 2) Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors.
    - b. Letter style[s], color[s], letter size[s] and layout position:
      - 1) As selected by Architect from manufacturer's standard letter style and color charts.
    - c. Raised text and graphic finishes:
      - 1) Colors/Sheen:
        - (a) As selected by Architect from manufacturer's standard colors.

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- (b) Finish: Matte.
- d. Text Schedule: As indicated on Drawings.
- e. Edge Detail: Square.
- f. Edge Finish: Brushed.
- g. Overall panel size: As indicated on Drawings.
- h. Recessed Graphics Color Options:
  - 1) As selected by Architect from manufacturer's standard colors.
- i. Recessed Area Texture Options:
  - 1) Smooth paint.

**2.05 NON-TACTILE SIGNAGE MEDIA**

- A. Silk Screened Plastic Panels: Letters and graphics silk screened onto reverse side of plastic surface:
  - 1. Sign Color: Clear.
  - 2. Total Thickness: 1/8 inch.

**2.06 ACCESSORIES**

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material.
- C. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material.
- D. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, installed in predrilled holes.
- E. Exposed Screws: Stainless steel.
  - 1. Exposed fasteners are permitted only where specifically indicated, and shall be tamper proof stainless steel, countersunk, and may be painted or finished to match adjacent surfaces.
- F. Tape Adhesive: Double sided tape, permanent adhesive.
- G. Adhesives:
  - 1. Type recommended by the manufacturer of the material specified to be laminated or adhered.
  - 2. No adhesives that fade, discolor or delaminate as a result of proximity to sunlight or heat therefrom shall be used.
  - 3. Adhesives shall not change the color or otherwise deteriorate the materials to which they are to be applied.
  - 4. The adhesives shall be of non-staining, non-yellowing quality.

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- H. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Do not start work until deficiencies have been corrected. Start of work of this section constitutes acceptance of the surfaces.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Mounting Method:
  - 1. Mount signs to surfaces with a minimum of four countersunk tamperproof stainless steel fasteners.
  - 2. Provide anchorage where necessary for fastening signs securely in place.
    - a. Anchorage not otherwise specified or indicated shall include expansion shields and power-driven fasteners;
      - 1) when approved:
        - (a) for concrete and masonry;
        - (b) toggle or molly bolts to plaster surfaces;
        - (c) full threaded wood screws to wood doors;
        - (d) machine or metal screws to metal doors.
      - b. Provide backing plates for mounting to expanded metal substrates.
    - 3. Adhere signs to glass with adhesive.
  - C. Install neatly, with horizontal edges level.
  - D. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and CBC Chapter 11B.
    - 1. Room and Door Signs: Locate on wall at latch side of door a minimum of 48 inches to the baseline of the lowest braille cells; with baseline of highest line of raised character text at maximum 60 inches above finished floor.
      - a. Comply with CBC 11B-703.4.1
  - E. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

**3.03 FIELD QUALITY CONTROL**

- A. Inspect signs for information content, appearance, location and Braille per as noted in Section 01 45 33 - Code-Required Special Inspections.

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**3.04 ADJUST AND CLEAN**

- A. Repair damage to signs incurred during installation. Replace signs which cannot be repaired to new condition. Clean glass, frames, and other sign surfaces, adjust hardware for proper operation.

**END OF SECTION**

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**SECTION 13 11 00**  
**SWIMMING POOL GENERAL REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

- A. The scope of the work included under this Section of the Specifications shall include swimming pool(s) as illustrated on the Drawings and specified herein. The General and Supplementary Conditions of the Specifications shall form a part and be included under this Section of the Specifications. The Swimming Pool Contractor shall provide all supervision, labor, material, equipment, machinery, plant and any and all other items necessary to complete the work. ALL OF THE WORK IN SECTIONS 13 11 00 – 13 11 08 IS TO BE THE RESPONSIBILITY OF ONE EXPERIENCED SWIMMING POOL CONTRACTOR PRIMARILY ENGAGED IN THE CONSTRUCTION OF COMMERCIAL PUBLIC-USE SWIMMING POOLS. A SWIMMING POOL CONTRACTOR SHALL BE CONSIDERED PRIMARILY ENGAGED AS REQUIRED HEREIN IF THE SUBCONTRACTOR DERIVED 50% OF ITS ANNUAL REVENUE FROM PUBLIC-USE SWIMMING POOL CONSTRUCTION FOR EACH OF THE LAST FIVE YEARS. THE SUBCONTRACTOR MUST HAVE ALSO, IN THE LAST FIVE YEARS CONSTRUCTED AT LEAST FIVE (5) COMMERCIALY DESIGNED MUNICIPAL AND PUBLIC-USE SWIMMING POOLS, EACH OF WHICH SHALL HAVE INCORPORATED A MINIMUM SIZE OF 6,000 SQUARE FEET OF WATER SURFACE AREA WITH A CONCRETE AND CERAMIC TILE PERIMETER OVERFLOW GUTTER AND SELF-MODULATING BALANCE TANK. The Swimming Pool Contractor shall furnish and install the swimming pool structures, finishes, cantilever forming, swimming pool mechanical and electrical systems, and all accessories necessary for a complete, functional swimming pool system, as herein described. Work shall include start-up, instruction of Owner’s personnel, as-built drawings and warranties as required.

**1.02 CODES, RULES, PERMITS, FEES**

- A. The swimming pools shall be constructed in strict accordance with the applicable provisions set forth by authorities having jurisdiction over swimming pool construction and operation in the State of California.
- B. The Swimming Pool Contractor shall give all necessary notices, obtain all permits, and pay all government sales taxes, fees, and other costs in connection with his work; file all necessary plans, prepare all documents and obtain all necessary approvals of governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Designated Representative before request for acceptance and final payment for the work.
- C. The Swimming Pool Contractor shall include in the work any labor, materials, services, apparatus, or drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.
- D. The Contractor shall submit all required documents and materials to all Governmental Departments having jurisdiction for any deferred approval items or substituted materials or products to obtain final approval to installation.

### **1.03 DESCRIPTION OF WORK**

- A. Furnish and install swimming pool finishes, including ceramic tile and marble plaster or other waterproof finishes.
- B. Furnish and install complete swimming pool mechanical system(s), including, but not limited to, circulation systems, filtration systems, pool water heating systems, water chemistry control systems, and all pumps, piping, valves, and connections between system(s) and swimming pool(s).
- C. Furnish and install complete swimming pool electrical system(s) from P.O.C. in Mechanical Room, including, but not limited to, control circuitry, motor starters, time clocks, bonding, and all conduits, conductors, contactors, and switches between the system(s) and swimming pool(s).
- D. After the initial filling of the swimming pool system(s), should any repairs, continuing work, or other Subcontractor responsibility require drainage or partial drainage of the swimming pool systems, the Swimming Pool Contractor shall be responsible for any subsequent refilling and shall complete the project with the swimming pool system(s) full of water, water in chemical balance, complete in every way, and in full operation.

### **1.04 ASSIGNED RESPONSIBILITIES AND RELATED WORK**

- A. It is the intent of this section of the Specifications to clarify Work responsibilities of the trades directly and indirectly involved in construction of the pool systems. All labor, equipment, materials and supplies furnished by the Swimming Pool Contractor and other Subcontractors shall be as directed by the Owner through his Designated Representative.
- B. THE SWIMMING POOL CONTRACTOR SHALL NOT SUBCONTRACT ANY PORTION OF THE SWIMMING POOL CONSTRUCTION OR SWIMMING POOL EQUIPMENT INSTALLATION TO ANYONE OTHER THAN A SUBCONTRACTOR THAT SATISFIES THE REQUIREMENTS OF SECTION 13 11 00.
- C. References to "swimming pool systems" shall include the swimming pools, equipment, and accessories.
- D. The Owner will provide one complete water filling of the swimming pool(s), but will not assume any responsibility for the swimming pool system(s) until they have been proved fully operational, complete in every way and accepted by the Designated Representative.

### **1.05 RESPONSIBILITIES OF THE CONTRACTOR**

- A. The Contractor shall provide adequate temporary light, electric power, heat and ventilation per Federal and State OSHA requirements to construct the swimming pool system(s).
- B. The Contractor shall protect the swimming pool(s) from damage caused by his construction equipment and /or workmen and Subcontractors.
- C. The Contractor shall provide a representative at time of swimming pool start-up to coordinate all trades related to swimming pool system(s).

### **1.06 INTENT**

- A. It is the intention of these specifications and Drawings to call for finished work, tested and ready for operation. Wherever the work "provide" is used, it shall mean "furnish and install complete and ready for use."

- B. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the work, the same as if herein specified or shown.

**1.07 SCHEDULE OF VALUES**

- A. Provide a Schedule of Values for all work specified in each of the technical specifications listed in the table below, regardless of whether the work is performed by the swimming pool contractor or others. Values listed shall be fully burdened, with contractor general conditions, overhead, profit and bonds included. Payments for swimming pool work completed shall not be approved until Schedule of Values has been submitted to and approved by Architect.

SWIMMING POOL SCHEDULE OF VALUES			
No.	Section #	Description	Value
1.	131104	Swimming Pool Ceramic Tile	
2.	131105	Swimming Pool Plaster	
3.	131106	Swimming Pool Equipment	
4.	131107	Swimming Pool Mechanical	
5.	131108	Swimming Pool Electrical	
Total			

**1.08 SUBMITTAL PROCEDURES**

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Subcontractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing submittals with performance construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity. 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.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for schedules performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for re-submittals as follows. Time for review shall commence on Architect's receipt of submittal.
  - 1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contract when a submittal being processed must be delayed for coordination.
  - 2. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow twenty-one (21) days for initial review of each submittal.

3. Direct Transmittal to Consultant: Where the Contract Documents indicate that submittals may be transmitted directly to Architect's consultants, provide duplicate copy of transmittal to Architect. Submittal will be returned to Architect before being returned to Subcontractor.
  4. If intermediate submittal is necessary, process it in same manner as initial submittal.
  5. Allow fifteen (15) days for processing each submittal.
  6. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- E. Identification: Place a title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on title block.
  2. Provide a space on title block to record Subcontractor's review and approval markings and action taken by Architect.
  3. Include the following information on title block for processing and recording action taken: (See Attached Sample)
    - a. Project name.
    - b. Date.
    - c. Name and address of Subcontractor.
    - d. Name of Subcontractor.
    - e. Name of Supplier.
    - f. Name of Manufacturer.
    - g. Unique identifier, including revision number.
    - h. Number and title of appropriate Specification Section.
    - i. Drawing number and detail references, as appropriate.
    - j. Other necessary identification.





- F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract documents on submittal.
- G. On all catalogue or cut sheets identify which model or type is being submitted.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Product data and shop drawings shall be packaged within a three-ring binder and colored samples shall be packaged on a heavy cardboard. Transmit each submittal using a transmittal form.
  - 1. On an attached separate sheet, prepared on Subcontractor's letterhead, record relevant information, request for data, revisions other than those requested by Architect on previous submittals and deviations from requirements of the Contract documents, including minor variations and limitations. Include the same label information as the related submittal.
  - 2. Include Subcontractor's certification stating that information submitted complies with requires of the Contract Documents.
  - 3. Transmittal Form: Provide locations on form for the following information:
    - a. Project name.
    - b. Date.
    - c. Destination (To:).
    - d. Source (From:).
    - e. Names of Subcontractor, manufacturer, and supplier.
    - f. Category and type of submittal.
    - g. Submittal purpose and description.
    - h. Remarks.
- I. 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.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

#### **1.09 SUBSTITUTIONS**

- A. To obtain approval to use unspecified products, bidders shall submit requests for substitution at least ten (10) days prior to bid date. Requests shall only be considered if they clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. All unspecified products and equipment will be considered on an "or equal" basis at the discretion of the Designated Representative. Requests for substitution received after the specified deadline will not be considered. Where a conflict exists between the requirements of the General Conditions / Special Conditions / Division 1 concerning substitutions and the requirements of this Article, this Article (Section 13 11 00, Article 1.8) shall govern.
- B. Where the Swimming Pool Contractor proposes to use an item of equipment other than that specified or detailed on the Drawings which requires any redesign of the structure, partitions,

foundations, piping, wiring, or any other part of the architectural, mechanical, or electrical layout, all such redesign and all new drawings (stamped by California Licensed Engineer) and detailing required shall be prepared by the Swimming Pool Contractor, at his own expense, submitted for review and approval by the Designated Representative prior to bid.

- C. Where such approved deviation requires a different quantity and arrangement of piping, supports and anchors, wiring, conduit, and equipment from that specified or indicated on the Drawings, the Swimming Pool Contractor shall furnish and install any such piping, structural supports, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

**1.10 SURVEYS AND MEASUREMENTS**

- A. The Swimming Pool Contractor shall base all measurements, both horizontal and vertical, from benchmarks established by the Contractor. All work shall agree with these established lines and levels. The mechanical Drawings do not give exact details as to elevations of piping, exact locations, etc. and do not show all offsets, control lines, pilot lines and other installation details. Verify all measurements at site and check the correctness of same as related to the work.

**1.11 DRAWINGS**

- A. Drawings are diagrammatic and indicate the general arrangement of the systems and work included in the Subcontractor. Drawings are not to be scaled. The architectural drawings and details shall be examined for exact dimensions. Where they are not definitely shown, this information shall be obtained from the Designated Representative.

**1.12 SWIMMING POOL CONTRACTOR**

- A. The swimming pool construction work as herein described and specified in Division 13 of the Project Manual shall be the complete responsibility of a qualified and specifically licensed (C-53 license classification within the State of California) Swimming Pool Contractor with extensive experience in commercial public use swimming pool installations.
- B. Contractor certifies that it meets the qualifications and experience requirements established in Swimming Pool General Requirements, Section 13 11 00, as follows:
  - 1. Contractor has derived 50% of its annual revenue from public-use swimming pool construction for each of the last five (5) years.
  - 2. Contractor has, in the last five (5) years, constructed at least five (5) commercially designed municipal and public-use swimming pools, each of which have incorporated a minimum size of 6,000 square feet of water surface area with a concrete and ceramic tile perimeter overflow gutter and self-modulating balance tank.
  - 3. The following list of projects meet the requirements above and the contact as reference by the Contractor, the Awarding Authority of their agent or designee.

- a. Owner: \_\_\_\_\_  
Scope of Project: \_\_\_\_\_  
Contact Person: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
Architect for Project: \_\_\_\_\_

- 
- b. Owner: \_\_\_\_\_  
 Scope of Project: \_\_\_\_\_  
 Contact Person: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 Architect for Project: \_\_\_\_\_
  
  - c. Owner: \_\_\_\_\_  
 Scope of Project: \_\_\_\_\_  
 Contact Person: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 Architect for Project: \_\_\_\_\_
  
  - d. Owner: \_\_\_\_\_  
 Scope of Project: \_\_\_\_\_  
 Contact Person: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 Architect for Project: \_\_\_\_\_
  
  - e. Owner: \_\_\_\_\_  
 Scope of Project: \_\_\_\_\_  
 Contact Person: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 Architect for Project: \_\_\_\_\_

**1.13 OPERATING INSTRUCTIONS**

- A. The Swimming Pool Contractor shall determine from actual samples of pool water supplied by the Owner, the proper water management program necessary for maximum operating efficiency and comfort. The Swimming Pool Contractor shall provide the services of experienced personnel familiar with this type of pool system operation, in conformance with Section 13 11 05 of the Specifications.

**1.14 MAINTENANCE MANUALS**

- A. The Swimming Pool Contractor shall provide six (6) bound sets for delivery to the Designated Representative of instructions for operating and maintaining all systems and equipment included in this Contract. Manufacturer’s advertising literature or catalog pictures will not be acceptable for operating and maintenance instructions.
- B. Bound in ring binders shall be all parts lists, periodic maintenance instructions and troubleshooting guidelines for all pool equipment, including but not limited to filters, pumps, controllers, water chemistry control equipment, etc.

**1.15 SECURE FROM THE OWNER**

- A. A complete Owner-furnished filling of the swimming pools.
- B. The Owner’s assistance, as specified herein, from the time of start-up until final written acceptance of the swimming pool system(s).

- C. Chemicals as required for swimming pool operation after Swimming Pool Contractor completes initial water chemistry balance and water treatment during the maintenance period described in Section 13 11 05 of the Specifications.

**1.16 WARRANTY**

- A. The Swimming Pool Contractor shall warrant all swimming pool finishes and systems against defects in material and workmanship for a period of one year after the date of acceptance by the Owner. Any repair or replacement required due to defective material or workmanship will be promptly corrected by the Swimming Pool Contractor.

PART 2 - PRODUCTS

- A. Not Used

PART 3 - EXECUTION

- A. Not Used

END OF SECTION

**SECTION 13 11 04**  
**SWIMMING POOL CERAMIC TILE**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

- A. Swimming pool ceramic tile detailed on the Drawings, including, but not limited to, the following:
1. Waterline Face Tile. (Deep Gutter Pool)
  2. Gutter Cap Tile. (Deep Gutter Pool)
  3. Lane Line / Target Tile
  4. Depth Marker Tile. (At Cantilever Deck Face)
  5. Depth / Caution Marker Tile. (At Deep Gutter Pool Deck)
  6. Trim Tile (at Steps.)
  7. Ramp Tile

**1.02 QUALITY ASSURANCE**

- A. Qualifications of Workers:
1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
  2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years' experience with the materials and methods specified.
  3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years' experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.
- B. Standards: In addition to complying with all pertinent codes and regulations:
1. Manufacture of all tile shall be in accordance with ANSI A 137.1.
  2. Install ceramic tile in accordance with the recommendations contained in the 2021 "Handbook for Ceramic Tile Installation" of the Tile Council of America, Inc.
- C. Tolerances: Install all swimming pool ceramic tile straight, true, plumb and square within a tolerance horizontally of one in 200 and a tolerance vertically of one in 500. Waterline and gutter bullnose tile shall be level to 1/8" (+/- 1/16") around entire perimeter of swimming pools.

**1.03 SUBMITTALS AND SUBSTITUTIONS**

- A. Provide submittals in conformance with the requirements of Section 01 33 00.
- B. Samples: Submit samples of each color and pattern in the specified groups. Character samples can be representative for review prior to screening of actual tile.

- C. Master Grade Certificate: Prior to opening ceramic tile containers, submit a Master Grade Certificate, signed by the manufacturer of the tile used and issued when the shipment is made, stating the grade, kind of tile, identification marks for the tile containers, and the name and location of the Project.
- D. Specifications: Submit manufacturer's recommended installation specifications for the Work.
- E. Submit proof of qualifications as specified in Article 1.02.A of this Section.

**1.04 PRODUCT HANDLING**

- A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.
- B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.
- C. Protection: Use all means necessary to protect swimming pool ceramic tile before, during and after installation and to protect the installed Work specified in other Sections.
- D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative.

**PART 2 - PRODUCTS**

**2.01 TILE**

- A. Waterline Face Tile: (Replace any damaged or rust spot tile)
  - 1. Material: All waterline face tile shall be glazed ceramic tile (Group III standard) as manufactured by Dal-Tile or approved equal.
  - 2. Size: 6 x 6 inches.
  - 3. Color: Dal-Tile #0129, 'Sky Blue'. Contact Kylee Midura kylee.midura@daltile.com (858) 344-0019. To match existing, regrout all tile.
- B. Gutter Cap Tile: (Replace any damaged or rust spot tile)
  - 1. Material: All gutter cap tile shall be glazed ceramic tile (Group III standard) as manufactured by Dal-Tile or approved equal.
  - 2. Size: 2-1/2 x 6 inches (#A-7250).
  - 3. Color: Dal-Tile #0129, 'Sky Blue'. To match existing, regrout all tile.
- C. Lane Line / Target Tile:
  - 1. Material: Group 3 quality, frost proof unglazed ceramic mosaic tile with absorption rate of less than 1% as manufactured by Dal-Tile or approved equal.
  - 2. Size: 1 x 1 inches.
  - 3. Color: Dal-Tile #D311, 'Black'. Regrout all tile.
- D. Depth Marker Tile (At Cantilever Deck Face):
  - 1. Material: All depth marker tile shall be glazed ceramic tile as manufactured and/or distributed by Dal-Tile, Precision Tile Co., or approved equal.
  - 2. Size: 1 x 1 inches.

3. Color: Dal-Tile #D311, 'Black' letters and numbers on #D317 'Biscuit' field. Regrout all tile.
- E. Depth / Caution Marker Tile (at deep gutter pool deck):
1. Material: Group 3 quality, frost proof unglazed ceramic mosaic tile with absorption rate of less than 1% as manufactured by Dal-Tile or approved equal.
  2. Size: 1 x 1 inches.
  3. Color: Dal-Tile #D311, 'Black' letters and numbers on #D317 'Biscuit' field.
- F. Trim Tile (on underwater steps):
1. Material: Group 3 quality, frost proof unglazed ceramic mosaic tile with absorption rate of less than 1% as manufactured by Dal-Tile or approved equal.
  2. Size: 1 x 1 inches with S-812 quarter round.
  3. Color: Dal-Tile #D311 'Black' trim tile to match existing and Dal-Tile #D317 'Biscuit' top stair tile to replace any damaged to match. Regrout all tile.
- G. Ramp Tile:
1. Material: Group 3 quality, frost proof unglazed ceramic mosaic tile with absorption rate of less than 1% as manufactured by Dal-Tile or approved equal.
  2. Size: 1 x 1 inches.
  3. Color: Dal-Tile #D317 'Biscuit'. Remove any damaged tile to match existing. Regrout all tile to remain.

## **2.02 MORTAR**

- A. Sand for Mortar: Comply with requirements of fine aggregate for concrete.
- B. Cement: Type I Portland Cement, conforming to ASTM C150.
- C. Hydrated Lime: Conforming to ASTM C206 or 207, Type S.
- D. Water: From a potable source.
- E. Mortar shall meet ASTM C270 standard.

## **2.03 THIN SET MORTAR**

- A. Laticrete 254 Platinum. Laticrete, Custom or equal.
- B. Water: From a potable source.
- C. Mortar shall meet ASTM C627.

## **2.04 GROUT**

- A. All tile grout shall be waterproof grout complying with the recommendations of TCA and ANSI A118.6 (4) standards. Grout color shall be grey for dark backgrounds, white for light backgrounds (verify colors with Architect).

## **2.05 OTHER MATERIALS**

- A. All other materials, not specifically described but required for a complete and proper installation of ceramic tile as indicated on the Drawings, shall be new, first quality of their respective kinds, and subject to the approval of the Owner's Representative.



## **PART 3 - EXECUTION**

### **3.01 SURFACE CONDITIONS**

- A. Inspection:
  - 1. Prior to all Work of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
  - 2. Verify that ceramic tile can be installed in accordance with the original design and all referenced standards.
- B. Discrepancies:
  - 1. In the event of discrepancy, immediately notify the Owner's Representative.
  - 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
  - 3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive its Work.

### **3.02 INSTALLATION**

- A. Method:
  - 1. Install all ceramic tile in strict accordance with installation method P601 90 of the 2021 Handbook for Ceramic Tile Installation of the Tile Council of America, Inc.
  - 2. Be certain to install all ceramic tile perfectly level, flush, plumb, and to the finish grades and elevations indicated on the Drawings.
- B. Interface:
  - 1. Carefully establish and follow the required horizontal and vertical elevations to insure proper and adequate space for the work and materials of other trades.
  - 2. Coordinate and cooperate as required with other trades to insure proper and adequate interface of ceramic tile Work with the Work of other trades.

### **3.03 GROUTING (REGROUT ALL NEW AND EXISTING TILE TO REMAIN)**

- A. Follow grout manufacturer's recommendations as to grouting procedures and precautions.
- B. Remove all grout haze, observing grout manufacturer's recommendations as to use of acid and chemical cleaners.

### **3.04 EXTRA STOCK**

- A. Provide one (1) unopened box of extra tile for 2.01A, 2.01B, 2.01C, and 2.01D for Owners use at a future time.

### **3.05 CLEAN-UP**

- A. Upon completion of the swimming pool ceramic tile installation, thoroughly clean and polish the exposed surfaces of tile work. Completely clean work area of debris and rubbish occasioned by this Work and dispose of to the approval of the Owner's Representative.

END OF SECTION

**SECTION 13 11 05**  
**SWIMMING POOL PLASTER**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

- A. Swimming pool plaster and waterproofing of swimming pool structures as indicated on the Drawings and herein specified.
- B. Start-up and operation instructions to Owner's operations and maintenance personnel and properly balance swimming pool water chemistry until the Owner takes occupancy.

**1.02 QUALITY ASSURANCE**

- A. Qualifications of Workers:
  - 1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
  - 2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years' experience with the materials and methods specified.
  - 3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years' experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.
- B. Standards: Swimming pool plaster shall conform with requirements of Chapter 31B of California Building Code, latest edition. In addition, meet requirements of applicable portions of most current edition of the "Technical Manual," National Plasterers Council, Mission Viejo, California.
- C. Start-up:
  - 1. Furnish a swimming pool water chemistry consultant, with a minimum of five (5) years' experience, possessing either AFO (Aquatic Facility Operator) or CPO (Certified Pool Operator) certification(s), to supervise and properly balance swimming pool water chemistry.
  - 2. Demonstrate to the Owner that all systems are fully operational and that calcium hardness, total alkalinity, chlorine residual and pH levels are within specified limits.
  - 3. Standards: Furnish labor and chemicals as required to condition the water properly to the following specifications:
    - a. Calcium Hardness: 200-400 parts per million (PPM)
    - b. Total Alkalinity: 80-100 PPM, minimum
    - c. Chlorine Residual: 1.00 to 2.00 PPM
    - d. pH Factor: 7.2 to 7.6

**1.03 SUBMITTALS AND SUBSTITUTIONS**

- A. Provide submittals in conformance with the requirements of Section 01 33 00.

- B. Submit proof of qualifications as specified in Article 1.02 and 1.02.C.1 of this Section.

#### **1.04 PRODUCT HANDLING**

- A. Delivery: Deliver materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.
- B. Storage: Store materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project Site.
- C. Protection: Use all means necessary to protect the swimming pool plaster before, during, and after installation and to protect the installed Work specified in other Sections.
- D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner.

#### **1.05 ENVIRONMENTAL CONDITIONS**

- A. No plastering shall be done under unsuitable conditions of weather or temperature. No plastering shall be done when prevailing temperature is 40 degrees Fahrenheit or less.
- B. Do not install plaster during rain and, if rain commences after plastering has begun, immediately protect the plaster from rain by all means necessary until the plaster has set.
- C. Do not install plaster during wind greater than 10 mph and, if wind commences after plastering has begun, immediately protect the plaster from wind by all means necessary until the plaster has set.

### **PART 2 - PRODUCTS**

#### **2.01 CEMENT / AGGREGATE**

- A. Luna Quartz® tiny pebble finish by Wet Edge Technologies. Altima® quartz finish by Wet Edge Technologies. Pebble-Fina® pool finish by Pebble Technologies.

#### **2.02 COLOR**

- A. All swimming pool plaster shall be white in color. Wet Edge Technologies shall be Luna Quartz® "Polar White". Wet Edge Technologies shall be Altima® "White". Pebble Technology shall be Pebble-Fina® "Classico". Contractor to obtain written approval on selected pebble color from the local Health Department prior to installation. Submit cut sheet, color sample and written approval for review by Architect and Owner

#### **2.03 WATER**

- A. Water for swimming pool plaster shall be clean and free from injurious amounts of acid, alkali, and organics.

#### **2.04 GUTTER WATERPROOFING**

- A. Xypex, Miracote Miraflex Membrane C, or approved equal. Mix and apply per manufacturer's recommendations for specific application. Color shall be Gray.

## **PART 3 - EXECUTION**

### **3.01 SURFACE CONDITIONS**

- A. Inspection:
  - 1. Prior to Work of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation can properly commence.
  - 2. Verify that swimming pool plaster can be installed in accordance with the original design and all referenced standards, including proprietary application techniques and application training/certifications.
- B. Discrepancies:
  - 1. In the event of discrepancy, immediately notify the Owner's Representative.
  - 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
  - 3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive the Work.

### **3.02 INSTALLATION OF GUTTER WATERPROOFING**

- A. Provide two (2) coats of the specified gutter waterproofing prior to plastering the swimming pool. Prepare surfaces to receive waterproofing and cure in conformance with manufacturer's recommendations. Provide steel trowel application method to ensure uniform smooth, dense surface finish.

### **3.03 INSTALLATION OF POOL PLASTER**

- A. Outdoor Pools or Spas:
  - 1. Completion of other work: DO NOT commence plastering of swimming pool(s) or spa(s) until the following conditions have been met:
    - a. The Health Department and/or other governing agencies have approved the pool(s) and/or spas) for plaster.
    - b. All concrete pool deck construction is complete and the pool decks have been thoroughly cleaned.
    - c. All landscaping in areas adjacent to the pool(s) or spa(s) is complete and the landscape irrigation system is operable.
    - d. All painting in the pool area is complete.
    - e. All welding and grinding in locations adjacent to the pool area are complete.
    - f. The backwash sewer connection is complete.
    - g. Pool(s) and/or spa(s) area(s) perimeter fencing installation is complete.
    - h. All trash and debris have been removed from areas adjacent to the pool(s) or spa(s), particularly those areas that are normally upwind from the pool(s) or spa(s).
    - i. All dust raising construction and/or activities in areas adjacent to the pool(s) or spa(s) are complete or mitigated.

- j. The circulation pump(s) is/are operational.
  - k. The mechanical system has been flushed sufficiently to remove all dirt and debris from the piping system.
  - l. All necessary chemicals (Chlorine, pH adjuster, Sodium Bicarbonate and Calcium Chloride or any other required chemicals) are on site and ready for use.
  - m. Obtain written approval from the Owner and the Architect.
- B. Contractor accepts all liability from damage done to the pool plaster if the pool(s) or spa(s) is (are) plaster before the completion of the above listed items or without the written approval of the Owner and the Architect.
- C. POOL PLASTER AUTHORIZATION FORM:
- 1. The pool(s) and or spa(s) at Saddleback College is/are hereby approved for the installation of the pool plaster. Pursuant to the requirements of specification section 13 11 05, paragraph 3.03.

\_\_\_\_\_  
Owner

\_\_\_\_\_  
Date

\_\_\_\_\_  
Architect / Project Manager

\_\_\_\_\_  
Date

- D. Preparation:
- 1. Do not apply plaster over dirt, rust, scale, grease, moisture, scuffed surfaces or conditions otherwise detrimental to the formation of a durable plaster finish.
  - 2. Consult with manufacturer on application to specific surfaces being treated. Follow manufacturer's recommendation for curing of cast-in-place concrete or shotcrete surfaces prior to application of plaster.
  - 3. Protect ceramic tile, decking, deck equipment, gratings, fittings and other items by suitable covering or masking.
  - 4. Mask or remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures and similar items in place not to receive pool plaster. Following completion of plaster for each space or area remove masking. Re-install all removed items utilizing workers skilled in the trades involved.
- E. Application:
- 1. Finish shall be applied to a uniform thickness of 3/8" to 1/2" over the entire surface. The walls shall be scratch-coated followed by a finish coat. Material applied to the floor after the walls have been applied shall be accelerated to assure uniform setting time throughout the pool surface.
  - 2. Float the plaster to a uniform plane and trowel to a smooth, dense, impervious surface using extreme care to avoid stains.
  - 3. Take special care in finishing around pool fittings, making sure to mask off or plug openings so as not to fill such openings with excess plaster. Be certain to completely

enclose pool fittings with plaster to insure a leak-proof seal around pipes, fittings, lights, anchors, etc.

4. Accurately interface with the finish planes of items installed by other trades.
5. Quartz-cement plaster is to be applied by a licensed applicator as approved by the manufacturer, and in accordance with manufacturer's training.

### **3.04 CURING**

- A. Preparation: Anticipate the need for required equipment and have all such equipment immediately available for use upon completion of pool plastering.
- B. Pool Filling:
  1. After the plaster has sufficiently dried and before drying has proceeded to a damaging point, cure the plaster by gradually filling the pool with water, preventing all damage to finished plaster surfaces.
  2. Flow the water continuously until the pool is filled.
  3. When the weather is hot and/or water pressure is low, keep the pool walls damp while the pool is filling.
  4. Coordinate with Contractor to ensure that the pool is continuously monitored while filling to prevent overflow.

### **3.05 EQUIPMENT ACTIVATION**

- A. All water chemistry and filtration mechanical equipment shall be operational upon filling of pool after plaster. Chemicals and other related support items as supplied by Contractor, shall be in supply at start-up.
- B. For the first seven (7) calendar days after completion of the pool plaster, brush all plastered surfaces at least twice a day and coordinate with General Contractor to ensure that the plaster is carefully maintained after the initial seven-day period. In addition, coordinate with the Contractor to ensure that pool filtration equipment is continuously running during the initial seven-day period.
- C. Start-up and provide qualified personnel to operate pool equipment for a period not less than seven (7) days after the pool is placed in operation, or until the Owner takes occupancy of the facility or letter of substantial completion. During this time, Contractor shall instruct and supervise the Owner's personnel in the various operating and maintenance techniques involved. Contractor shall be responsible for supply of chemicals during this not less than seven (7) day period and at time of turnover to Owner, chemical storage tanks shall be full. (Owner's personnel shall be fully trained and capable of assuming swimming pool maintenance tasks, training may begin before Owner takes occupancy).

### **3.06 CLEAN-UP**

- A. Upon completion of swimming pool plaster, remove all materials, equipment and debris occasioned by this Work and leave the job site in a clean and presentable condition. Perform all such clean-up to the approval of the Owner's Representative.

### **3.07 WARRANTY**

- A. All applicators must provide a minimum of five (5) year warranty for application and workmanship additional to the manufacturer's warranty for product.

END OF SECTION



**SECTION 13 11 06**  
**SWIMMING POOL EQUIPMENT**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

- A. Swimming pool equipment items required for this Work as indicated on the Drawings and specified herein.

**1.02 QUALITY ASSURANCE**

- A. Qualifications of Workers:
  - 1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
  - 2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
  - 3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.
- B. All equipment supplied or work performed shall comply with regulations governing public swimming pools and spas as contained within Chapter 31 of California Building Code, 2019 edition.

**1.03 SUBMITTALS AND SUBSTITUTIONS**

- A. Provide submittals in conformance with the requirements of Section 01 33 00.
- B. Required submittals include:
  - 1. Swimming Pool Fittings, Deck and Mechanical Equipment as specified in Article 2.01-2.10 of this Section.
- C. Submit proof of qualifications as specified in Article 1.02.A of this Section.
- D. The equipment shown on the plans represent the first listed items in the technical specifications. The Contractor shall be responsible for all required field coordination and installation of any approved equal product to provide a fully working and warranted system. The Contractor shall submit detailed shop drawings for any products used other than the first listed specified items. Contractor provided shop drawings shall include details and quality equal to the original plans and construction documents. The Contractor shall provide any and all required engineering including but not limited to structural and anchorage requirements for any proposed equipment other than the first listed specified equipment. The Contractor is responsible to provide a factory certified representative(s) to start-up and provide on-site training for all swimming pool mechanical equipment provided.

#### **1.04 PRODUCT HANDLING**

- A. Protection: Use all means necessary to protect swimming pool equipment items before, during and after installation and to protect the installed work specified in other Sections.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative.

### **PART 2 - PRODUCTS**

#### **2.01 FITTINGS**

- A. Main Drain Frame & Grate (18" x 18"): Lawson Aquatics #FGD-SG-1818 with VGB Compliant Grates, or approved equal, two (2) required. Contractor shall provide to the Owner a Certificate of Compliance, signed by a licensed design professional, for main drain sump(s) and frame(s) and grate(s), as required by the Virginia Graeme Baker Act.

#### **2.02 DECK EQUIPMENT**

- A. Lane Line Anchors: Heavy eye bolt with insert. KDI-Paragon #73017/18 or equal. Replace any damaged to match existing.
- B. Stainless Steel Escutcheon Plates for Handrails: Spectrum Model #35214, no known equal. Six (6) required. Replace any damaged to match existing.
- C. Accessible Lift: 'Aqua Creek' Mighty Lift 400, #MTY400 with 400 lb. lifting capacity. Furnish with Scout Mighty #F-808SA-10, 10" deep anchor, lift cover, extra battery and transporter cart. Two (2) required.

#### **2.03 COMPETITION POOL STRAINERS**

- A. 'MerMade' F.O. series FRP reducing basket strainer: Two (2) 12" x 10" standard, with acrylic lid and two (2) stainless steel strainers each (150 lbs.)

#### **2.04 COMPETITION POOL CIRCULATION PUMP(S) (TWO (2) TOTAL @ 100% REQUIRED FLOW)**

- A. 'Paco' #8015-3 or 4; 8" x 10" x 15" Type 'KPV' split case centrifugal pump; 1150 RPM 460V, 3PH; 50HP; rated at 2085 GPM @ 65 Ft. TDH; 86% efficient; premium efficiency TEFC motor; epoxy coat all wet surfaces. 'Paco', 'Aurora' or equal. (2,000 lbs.) Provide smart pump control system SPCS #SPCS050BC4A (38" x 32" x 16") 317 lbs. at Competition Pool and SPCS #SPCS007BC4A (38" x 32" x 16") 105 lbs. at Therapy Pool variable frequency drives for use with 'BecSys 7' controllers. Coordinate mounting location to maintain required clearances, 480V 3PH. Wire VSD to provide for one (1) pump operation at a time with a second pump lockout.

#### **2.05 COMPETITION POOL FILTERS: EPD HIGH RATE SAND FILTER SYSTEM – MODEL EPD-7120. THERAPY POOL FILTER: EPD HIGH RATE SAND FILTER SYSTEM MODEL EPD-150.**

The intent of this filter system specification is to establish material and performance criteria that will benefit the owners and operators of said filter system. Certificated proof of materials and design, plus proof of performance and localized service, shall be a requirement of this specification.

The filter system, specified herein, shall be the standard cataloged product of a company regularly engaged in the manufacture of industrial and commercial grade fully automatic

horizontal configuration pressure type Hi-Rate Permanent Media filtration equipment. The filtration system shall be model EPD-7120 manufactured by EPD USA, Inc., Banning, CA.

The system shall consist of filter tanks, face piping with controlling valves, automated filter control device, gauges, hardware, air relief system, pressure amplification system, setting templates, printed installation/operation and service manuals, filter media and printed manufacturer's warranties.

A. Filter Performance Criteria

1. The filter system shall be of the pressure type, horizontal in its configuration, suitable for a single grade of filter media, and shall bear the listing mark of the National Sanitation Foundation (NSF Standard 50 for a maximum flow of 20 gallons per minute per square foot of filter area with a maximum pressure loss across any filter tank, when clean, of 6.1 psi.
2. The Competition Pool filter system shall consist of seven (7) filter tank(s). Each tank shall have a total effective filter area of 20 square feet. The system will have a total effective filter area of 140 square feet. When operating at 15 gallons per minute per square foot, the filter system will have a capacity of filtering 2,100 gallons in six (6) hours. Each filter tank in the system shall be backwashed individually, using clean filtered water from the adjacent tank(s). Reverse flow backwash of the filter system with raw unfiltered source water will not be acceptable.
3. The Therapy Pool filter system shall consist of one (1) filter tank. The tank shall have a total effective filter area of 13.5 square feet. When operating at 15 gallons per minute per square foot, the filter system will have a capacity of filtering 202 gallons in six (6) hours. All internal and external piping components, valving and dimension as per EPD 13.5 sq. ft. steel tank. (The remainder of the specification applies to the Competition Pool filter system).

B. Filter Tank(s)

1. Tank(s)
  - a. The filter vessel(s) shall be 42 inches in diameter with a side shell length of 60 inches, allowing for ease of installation, specified flow and backwash rates as well as ease of service.
  - b. Dished and flanged heads shall be butt welded to each end of the side shell. The side shell and heads shall be carbon steel, ¼ inch thick and suitable for a working pressure of 50 psi with a safety factor of 4 to 1 and a vacuum of 25 inches of mercury. Tanks fabricated of filament wound fiberglass and/or reinforced plastic will not be acceptable methods and/or materials of construction. Tanks fabricated of stainless steel will not be allowed unless they meet all provisions of this specification, i.e. material thickness, welds, coatings, etc.
  - c. All welds shall be continuous, uniform and performed on the outside of all joints within the tank(s). Jig locator and hold down fixtures shall be utilized to assure continuity of tanks and their fitting locations.
  - d. An 11-inch x 15-inch Flanged access manway with cover and o-ring seal shall be fitted at the front end of the tank, providing ease of access for media loading and service. Side and top located manways shall not be allowed as they limit tank interior access. Yoked manways in any location shall not be allowed.

- e. The filter vessel shall be fitted with two (2) 6-inch bottomed flanges located in the top side shell to serve as influent and effluent plumbing connections. A 2-inch bottomed flanged port shall be located in the lower portion of the tank to serve as winterizing and/or media dump port connection. Another 2-inch port shall be located in the upper most portion of the side shell to serve as a manual air relief valve/port connection. All four Duplex Bottomed Flanges shall contain threaded bottomed fastener ports to allow connection of companion flanges to the outside of the vessel without allowing fastening bolts to penetrate to the inside of the vessel.
  - f. The filter vessel shall be supported by four (4) gusseted strap type legs which shall accommodate seismic zone 4 installation. All necessary mounting hardware shall be provided along with an anchor bolt setting template for ease and accuracy of filter vessel installation.
2. Protective Coatings
- a. All interior and exterior surfaces of the filter tank and its penetrations shall be grit blasted to white metal. All interior and outer flanged surfaces shall be bound with a seamless coating of "Primabond"™ LLD Polyethylene NSF Standard 61 listed material. There will be no separation between the lining and the tank allowed. The material must maintain a minimum of .20-inch thickness inside the vessel and flow smoothly out through the flange openings and onto the flange faces. All wetted surfaces will be inspected for proper mil thickness and holidays.
  - b. The tank exterior surface shall be coated with 3 to 5 mils of an industrial grade polyurethane high gloss B finish coat.
3. Internal Distribution and Collection System
- a. The internal components shall be hydraulically balanced to prevent migration of the filter media during the filtration cycles and must uniformly fluidize the media in the backwash cycle without channeling or breakthrough at any one location.
  - b. The influent distribution system shall consist of no less than then (10) hydraulic distribution lenses, which shall be fabricated of ABS plastic and PVC pipe and fittings. Distribution systems consisting of slotted pipes, or splash plates, will not be acceptable.
  - c. The collection system shall consist of a PVC collection header, schedule 80 piping and molded ABS "V" slotted 12" long threaded laterals. The laterals shall be capable of retaining a #30 grade filter media with minimum head loss. Laterals, which are made from plastic pipe with saw, cut slots or covered pipes will not be allowed. A minimum of twenty-four (24) molded laterals shall be utilized in each filter tank, assuring an even and complete fluidization of filter media during the backwashing cycle. The combined open area of the laterals shall not exceed a velocity of 6-feet per second at the designed filter flow rate. All internal components, including main headers, must be removable for repair and/or replacement should damage occur.
4. Air Relief System
- a. An internal automatic air bleed system shall be provided in the tank. An anti-plug protective shield screen shall be installed on each assembly. A manually operated external air relief valve shall be provided on the tank.
5. Winterizing/Drain and Media Dump Port

- a. In the front of each vessel shall be located a ¾-inch drain fitting which shall allow the evacuation of all water from the tank for the purpose of winterizing or service. A ¾-inch O-ring seal plug adapter shall be provided for ease of removal and replacement. No media shall be allowed to leave the tank during the draining process.
- b. The media dump port shall allow for the removal of all filter media from the vessel within 30 minutes. This dump port shall be a minimum of 2-inches in diameter and shall be installed in the front of each filter vessel, allowing for easy access.

C. BACKWASH VALVES AND PIPING

1. Backwash Valve

- a. One (1) two-way, three port 6-inch backwash valve shall be supplied on each filter tank. The valve body shall be machined from heavy cast bronze. Plastic valve bodies will not be considered for this industrial/commercial use. Victaulic type couplers shall be provided at each port of the valve for connection to the filter tank and manifold piping. Each valve shall be fitted with a nominal 6-inch diameter piston operated hydraulic cylinder to actuate the valve. Electrically or diaphragm actuated valves will not be allowed. External valve linkage will not be allowed for safety and potential maladjustment reasons. The internal piston shaft shall be type 302 stainless steel and shall be supported above and below the piston with Delrin guide bushings. A silicone impregnated felt wiper shall be provided for internal shaft quad ring lubrication. All exterior coating of the valve shall be in accordance with the exterior coating specification of the filter tank. All stainless steel components used in this assembly shall be passivated and rinsed after forming and machining.
- b. The backwash valve shall be designed to allow for continuous circulation pump operation during the cycling between filter and backwash of the filter system. This requirement is for the prevention of potential loss of circulation pump prime and/or damage to boiler, chemical feed systems and piping.

2. Flow Control Valve

- a. An electrically actuated rate of flow control valve shall be provided for installation onto the effluent line of the filter system. The valve shall be 12-inch IPS.

3. Piping

- a. The influent, effluent and waste manifolds shall be constructed of PVC Schedule 80 pipe and fittings. The influent and effluent manifolds shall be 12-inch IPS. The manifolds shall be attached with victaulic type couplings to provide alignment, flexibility and absorption of seismic stress as well as noise and vibration attenuation. The waste line shall be a 6-inch IPS manifold and shall be fitted with a waste control valve and clear 6-inch diameter sight glass assembly. The valve shall be of the tamper proof design and require a tool for backwash flow rate change. To minimize floor space requirements and provide unhindered access to filter control PLC, media dump port and manhole, backwash valves and manifold piping shall be located on top of filter tanks. All piping shall be factory assembled and pressure tested. The assemblies shall then be coated with a material to prevent ultraviolet ray degradation of the plastic and shall color match all other system components.

4. Backwash Flow Rate

- a. A 6-inch flow meter shall be provided and installed on the backwash piping following the filter system, per manufacturer's instructions.
- D. FULLY AUTOMATIC BACKWASH
1. Fully automated backwash shall be controlled by a BECSys7 mechanical room control system. A backwash solenoid assembly shall be provided with the BECSys7 controller.
- E. PRESSURE SUPPLY SYSTEM
1. An in-line "Y" strainer, 2 ½ inch 0-100 psi pressure gauge and pressure regulator shall be supplied as part of the filter system. The pressure supply system shall clean and govern the pressure of the water used to actuate the filter system's automatic valves.
- F. PRESSURE AMPLIFICATION SYSTEM
1. A Pressure Amplification System shall be provided and shall consist of a single suction centrifugal pump, hydro-pneumatic pressure sustaining tank, adjustable pressure switch, 50-feet of 3/8- inch Nylo Seal tubing and all necessary tubing connectors. This system shall use the filter system effluent water for actuation of backwash valves.
  2. Pump
  3. The housing and impeller shall be made of molded fiberglass reinforced thermoplastic. A mechanical seal shall be provided between the pump housing and the motor. The seal shall be a precision lapped, highly polished carbon-ceramic stainless steel shaft seal, assuring drip proof protection.
  4. The motor shall be a ½ HP, single phase, 60 cycle, 3450 RPM, suitable for service with a 115 volt PLC Filter Controller or a ¾ HP, single phase, 50 cycle, 2800 RPM, suitable for service through a relay with the 24 volt output of the PLC Filter Controller. The motor shall be a NEMA "C" face square flange mounting with a drip proof enclosure. The motor shall be equipped with sealed ball bearings to provide for smooth, quiet operation.
  5. The booster pump shall be performance rated at five (5) gallons per minute at 93-feet of head.
- G. Tank
1. Pressurized water shall be contained in a hydro-pneumatic steel tank which shall be lined with an epoxy coating. The tank will employ a flexing diaphragm separating wet and dry chambers. The steel tank shall be designed for maximum working pressure of one hundred (100) psi. Tank connection shall be ¾- inch NPTM.
- H. Pressure Switch
1. A pressure switch shall be mounted directly to the pump motor and shall be rated for the operation of a 1-1/2 HP motor at 115 volt, single phase. The switch will allow for adjustment of cut-in and cut-out pressure.
- I. Check Valve
1. A 1/2-inch spring loaded check valve shall be supplied as part of the assembly. The check valve shall be installed on the pump suction and shall be designed to retain water pressure accumulated within the amplification system.
- J. Tubing and Fittings

1. Fifty-feet of 3/8-inch Nylo Seal tubing and all necessary tubing to pipe fittings shall be supplied for the connection of the Pressure Amplification System to the filter system and the PLC Filter Controller.

K. Finish

1. The entire system shall be coated with an industrial grade polyurethane high gloss protective finish, similar in color to that of the filter system.

L. CERTIFICATION

1. Proof of National Sanitation Foundation (NSF) and Underwriters Laboratories (UL) listing is also required.

M. HARDWARE

1. All fasteners (nuts, bolts and washers) employed in the system and components of the system shall be provided by the filter manufacturer, all of which shall be cadmium plated.

N. INSTRUCTIONS

1. Printed and bound operating, installation and service manuals with exploded parts lists shall be supplied with the filter system.

O. START-UP

1. The manufacturer of the filtration system shall provide his services or those of his locally appointed factory representative for one day at the time of start-up of the filter system. The start-up shall include adjustments to the filter system and all of its controlling components, calibration and set-up of the filter controller and instructions to the owner and operators of the filter system.
2. The factory or its local service representative shall visit the filter system installation prior to the completion of one year of service. The factory/representative, with the owner and operator, will inspect all of the filter system components for signs of wear/malfunction at that time. Any and all worn or malfunctioning items shall be replaced at no expense to the owner. The representative will thoroughly instruct the owner/operator on annual service procedures for the filtration system, all at no expense to the owner.

P. FILTER MEDIA

1. The filter media shall be of a single grade and shall consist of uniformly graded silica sand with rough irregular edges, not rounded, which shall be free of limestone or clay. Twenty-four (24) cubic feet of media per tank will be required, support media (gravel) will not be allowed.
2. #20 Sand (recommended for general purpose use) Filter media shall be Grade #20, with angular grains, effective size .45 millimeter with a uniformity coefficient of 1.5 maximum

MEDIA ANALYSIS

Sieve No. (US Series)	mm Opening	Percent Retained on Sieve (By Weight)
20	0.833 (0.333 in)	2
30	0.589 (0.023 in)	58
40	0.417 (0.016 in)	36

**Q. PACKAGING**

1. To protect and safeguard all components of the filter system, they shall be supplied in wooden crates to facilitate shipment, handling and /or storage on job site.

**R. WARRANTY**

1. The manufacturer warrants its products to be free from defects in materials and workmanship under normal conditions of service, from date to delivery, for the following periods of time:
  - Filter Systems: 20 years prorated, steel tank.
  - 100% tank & internal components: First year.
  - 100% Electrical\ Electronic components: First year.
2. Any items that are purchased and supplied as part of the filter system but are not manufactured directly by EPD shall carry the standard manufacturer's warranty as supplied with that particular item.

**2.06 (E) HEAT EXCHANGERS**

- A. Utilize existing heat exchangers. POC to exiting pool influent/effluent lines, 4" at competition pool and 2" at training pool, and utilize all existing valving, temperature probes, etc. Field verify POC's.

**2.07 (N) CHLORINE FEED SYSTEM**

- A. Provide one (1) 'Chem-Tainer' 1,000 Gallon #TC7485DC; dual storage/containment tank with lid seismically restrained; (8,331 lbs.). Complies with Fed. Reg. #40CFR-264-163. Competition Pool feed pump shall be 'LMI' #SD43-88P-KSI; 288 GPD @ 15 PSI with FRP shelf bracket. Hard pipe to point of injection. Training Pool feed pump shall be 'Stenner' #85M5, 85 GPD @ 25 PSI.

**2.08 (N) ACID STORAGE/FEED SYSTEM**

- A. Provide 'Chem-Tainer' 350 Gallon #TC5256DC; dual storage/containment tank with lid seismically restrained; (2,915 lbs). Complies with Fed. Reg. #40CFR-264-163. Feed pumps shall part of the Carbon Dioxide alkalinity control system. Provide a complete acid vapor recovery system.

**2.09 CARBON DIOXIDE STORAGE/FEED SYSTEM**

- A. Relocate existing 'Novo'-750 lbs. cryogenic liquid CO2 storage tank per plans and provide one (1) new 'Novo'-750 lbs. cryogenic liquid CO2 storage tank located per plans with 594 liquid lbs. (5195 cubic feet of gaseous CO2 at NTP). Provide new EKO PH-MTS CO2 high efficiency feed system with alkalinity control, 0 to 160 SCFH capacity booster pump, piping injector, flowmeter, relays and acid feet alkalinity control. Two (2) systems total. (92 lbs.) Provide hard wired 'Analog' #API Kit CO2 detector with audible and visual arms in each chemical room, UL 1971 standard listed, one (1) total.



## 2.10 COMPETITION AND THERAPY POOL WATER CHEMISTRY CONTROLLERS: TWO (2) TOTAL.

The equipment room controller package shall be BECS Technology model CS-BECSYS7-BP-E packaged by Eko3 Systems. Controllers shall support full BMS-BACnet communication as directed by the Owner.

### A. General

1. The integrated equipment room control system shall provide continuous monitoring and control of sanitizers, oxidizers, pH, temperature, system flow rate monitoring, total dissolved solids (TDS), turbidity, chemical inventory levels, surge tank and backwash holding tank water levels, system pressures, and water chemistry balance calculations. The control system shall also provide automatic control of the filtration system including backwash operation. Installation of the system shall be per the manufacturer's specification and no exceptions shall be allowed. A factory trained/authorized representative shall provide system commissioning and training to the owner.

### B. Certifications

1. The controller shall carry the following product certifications:
  - a. UL 61010-1
  - b. (CSA) C22.2 Number 61010-1
  - c. European Union Low Voltage Directive 73/23/EEC EN 61010-1

### C. Sensors

The controller shall include pH, ORP, ppm and temperature sensors meeting the following requirements:

1. pH sensor
  - a. The controller shall continuously monitor, display and data log pH with 0.1 or 0.01 resolution (programmable) and provide a measurement of pH by utilizing a sensor with the following characteristics:
    - 1) 0 – 14 sensing range;
    - 2) ABS body with ½" NPT process connection;
    - 3) Minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal;
    - 4) A porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction;
    - 5) A silver/silver chloride (Ag/AgCl) reference element;
    - 6) A general purpose glass membrane pH sensing element;
    - 7) Operating temperature range of 0 - 80 degrees C;
    - 8) Operating pressure range of 0 - 100 psiG.
2. ORP / HRR sensor
  - a. The controller shall continuously monitor, display and data log ORP with 1mV resolution and provide a measurement of ORP by utilizing a sensor with the following characteristics:
    - 1) -1000 to +1000mV sensing range;

- 2) ABS body with ½" NPT process connection;
  - 3) Minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal;
  - 4) A porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction;
  - 5) A silver/silver chloride (Ag/AgCl) reference element;
  - 6) A solid platinum or solid gold ORP sensing element with a minimum of 1 cm<sup>2</sup> surface area; platinum-plated and gold-plated sensing elements, which are susceptible to abrasives, shall not be considered equal;
  - 7) Operating temperature range of 0 - 80 degrees C;
  - 8) Operating pressure range of 0 - 100 psig.
3. Amperometric (ppm) Sensor
    - a. The optional Free Chlorine sensor shall be an amperometric probe system with a measuring range of 0.05 to 20 mg/l with a fully selectable scale and a temperature range of 36°-113° Fahrenheit. The amperometric probe shall come with a PVC body, replaceable PTFE membrane and electrolyte, gold cathode and silver/ silver chloride anode.
  4. Temperature Sensor
    - a. The controller shall continuously monitor, display and data log temperature with 1°F resolution and provide a measurement of water temperature by utilizing a sensor with the following characteristics:
      - 1) 32 – 212°F (0 – 100°C) sensing range;
      - 2) 2 wire, 100Ω resistive temperature detector (RTD) with an 0.00385 Alpha.
  5. Flow Sensor
    - a. The controller shall continuously monitor, display and data log flow rate with 0.1 gpm resolution and shall provide a measurement of pool circulation flow rate and volume by utilizing a flow sensor with the following characteristics:
      - 1) 0-8800 gpm (0-33265 liter/min) measuring range,
      - 2) Paddle wheel flow sensor with a frequency output,
      - 3) Dual O-ring seal,
      - 4) 25 foot cable,
      - 5) Iron pipe saddle,
      - 6) Flow volume: 999 trillion gallons, 1 gallon resolution; 999 trillion liters, 1 liter resolution.
  6. 4-20mA Sensor
    - a. The controller shall be capable of reading a total of eight (8) 4-20mA output sensors, including the following:
      - 1) Pressure Transducers (Quantity 2)

The controller shall continuously monitor, display and data log pressure(s) with 1 psiG resolution and provide measurement of filter influent and/or filter effluent pressure by utilizing pressure transducer(s) with the following characteristics:

- (a) 0 to 100 psiG measuring range,
- (b)  $< \pm 2\%$  span max @ 25°C which includes linearity, hysteresis and repeatability,
- (c) 0.25% static error band and 1.5% typical thermal error band,
- (d) Temperature compensated and fully calibrated,
- (e) Stainless steel wetted components with plumbing connections of 1/4".

2) Vacuum Transducer (Quantity 1)

The controller shall continuously monitor, display and data log vacuum(s) with 1 psiG resolution and provide measurement of strainer vacuum by utilizing a vacuum transducer with the following characteristics:

- (a) -15 to +85 psiG measuring range,
- (b)  $< \pm 2\%$  span max @ 25°C which includes linearity, hysteresis and repeatability,
- (c) 0.25% static error band and 1.5% typical thermal error band,
- (d) Temperature compensated and fully calibrated,
- (e) Stainless steel wetted components with plumbing connections of 1/4".

3) Liquid Level Sensors - Three (3) total

The controller shall provide measurement of liquid levels for surge tanks, backwash holding tanks and/or liquid chemical inventory by utilizing liquid level sensor(s) with the following characteristics:

- (a) Field configurable sensing range from 3 ft to 16 ft,
- (b) Field calibration for various tank levels, shapes and sizes,
- (c) Non-contacting sensing elements enclosed in PVC.

4) Conductivity/TDS Sensor

5) The controller shall continuously monitor, display and data log conductivity/TDS with 1 micromho/ppm resolution and provide a measurement of conductivity/TDS by utilizing a sensor with the following characteristics:

- (a) 0-20,000 micromhos (0-10,000 ppm TDS) measuring range
- (b) A 316 stainless steel electrode,
- (c) PTFE insulator as well as a dual EPR O-ring seals,
- (d) AC operation, which resists electrode plating.

D. User Interface

1. Standard Display

The standard display shall be a backlit transreflective LCD with 14 line x 40 alpha/numeric graphical characters that will continuously display information related to the following:

- a. All installed sensor readings,
- b. Set points, with current control status,

- c. All active alarms, including time activated,
  - d. Smart menus w/ integrated on-screen help.
2. Contrast adjustment of the backlit LCD shall be provided through clearly marked keys on the front-panel without the need for access to internal controller circuitry. After initial adjustment, controller shall monitor internal temperature and automatically adjust contrast to prevent LCD blackout in extreme ambient temperature conditions. Controllers that do not include front-panel contrast adjustment and automatic temperature compensation shall not be considered equal.
  3. The standard user interface shall include single-touch access to Set Points, Relay Modes, Calibrations, Backwash status and settings, Menu access, and Reset Fail/Safes. An alphanumeric keypad shall be provided for ease of system configuration.

#### E. Control Functions

##### 1. Water Chemistry

- a. pH Control: The controller shall continuously control pH. Chemical feed shall be configurable for feed-up, feed-down, or dual feed and either on/off or time-based proportional feed.
- b. Sanitizer Control: The controller shall continuously control sanitizer based upon the ORP reading, the amperometric sensor, or both with a bracketed control program. Chemical feed shall be configurable for either on/off or time-based proportional feed.
- c. Bracketed Sanitizer Control: With the amperometric ppm sensor, the controller shall be configurable for bracketed sanitizer control; The bracketed control algorithm shall allow either the ORP or ppm setpoint to be chosen as the primary control point, while using other parameter to create a secondary boundary (min and max settings) that must be maintained in addition to the primary control point.
- d. Sanitizer Booster Feed: The controller shall have a sanitizer booster program with selectable ORP and/or ppm set points with separate ending set points, allowing the option of the booster sanitizer to control to a lower set point while the primary system can recover.
- e. Ozone/UV Control: The controller shall provide feed-up control of an ozone or UV system based upon ORP and/or ppm set points. A Fireman Cycle feature shall turn off the Ozone/UV relay 0 to 60 minutes (settable) prior to backwash initiation or recirculation pump shutdown. The Ozone/UV control algorithm shall include an Energy Conservation mode, with on/off set time and secondary set point.
- f. Superchlorination: The controller shall have a programmable superchlorination function, based ORP or ppm superchlor setpoint, which is triggered manually.
- g. Dechlorination: The controller shall have a programmable dechlorination function, based upon ORP or ppm dechlor setpoint, which is triggered either manually or by the completion of the superchlorination function.
- h. LSI & RSI: The controller shall compute the Langelier Saturation Index and the Ryznar Saturation Index based upon current inputs and the Ca Hardness and Alkalinity entered by the operator.

- i. Flow Monitoring: The controller shall continuously monitor, display, and data log system flow, maintaining a total flow volume. A low flow alarm shall be operator settable, which can be programmed to disable chemical feeds.
- j. Heater Control: The controller shall perform on/off control of a heater based upon an operator settable temperature set point. A Fireman Cycle feature shall turn off the heater 0 to 60 minutes (settable) prior to recirculation pump shutdown. Heater control algorithm shall include an Energy Conservation mode, with on/off set time and secondary temperature set point.
- k. Chemical Inventory Monitoring: The controller shall continuously monitor, display, and data log liquid pH adjuster and sanitizer inventory levels. The controller shall include low chemical level alarm points for each chemical being monitored.
- l. Backwash tank Monitoring: The controller shall continuously monitor, display, and data log backwash holding tank levels.
- m. Surge tank Monitoring: The controller shall continuously monitor, display, and data log surge tank levels.
- n. Autofill: The controller shall automatically control a water makeup relay to add makeup water to maintain pool level set point, based upon surge tanks (or equivalent) level, with an overflow delay feature. The controller shall provide a programmable alternate set point (4 event 28-day timer). Use in conjunction with 3" valve specified in Section 13 11 07, 2.03G
- o. Sensor Wash: The controller shall include a programmable sensor wash with start and end time, feed duration, and number of cycle to allow multiple feed cycles per day.

F. Energy Conservation

- 1. Alternate Setpoints: The controller shall have alternate Sanitizer, Heater, and Autofill setpoints, based upon a 4 event 28-day timer.
- 2. Energy Conservation Mode: The controller shall have the capability to disable all mechanical and chemical functions during programmed conservation cycle. The Energy Conservation Mode shall include the ability to periodically monitor and satisfy all operation requirements based upon a programmed time schedule.

G. Automatic Backwash

- 1. Backwash Initiation: The controller shall be user configurable to initiate backwash upon any of the following conditions:
  - a. Time, based upon a 24-hour, 7-day programmable calendar,
  - b. Pressure Differential, taken from either a pressure differential switch or an operator settable low-pressure differential setpoint based upon the differential between two installed pressure transducers,
  - c. Low System Flow, an operator settable low flow set point based upon the installed system flow meter,
  - d. Totalized filter water volume, an operator settable totalized filter water volume set point based upon the total system flow maintained by the controller from the installed system flow meter,

- e. High filter effluent turbidity, an operator settable turbidity set point based upon the installed turbidity sensor,
  - f. Manual, which only initiates backwash when manually activated by operator.
2. Normal Operation: The controller shall be capable of controlling the backwash operation of up to 16 filters, with the following backwash features included as part of normal programming.
- a. Inhibit Period, Operator settable daily time period during which backwash is prevented from being triggered.
  - b. Backwash Frequency Fail Safe: Prevents an automatically triggered backwash from starting within this time period from the end of the previous backwash. Does not prevent a Manual initiation of backwash.
  - c. Fireman Cycles: The controller shall provide operator settable independent Fireman Cycle settings for the Heater and Ozone/UV controls. The controller shall automatically delay the start of the backwash operation until the Heater and Ozone/UV controls have been deactivated and the corresponding Fireman Cycles have expired.
  - d. Primary/Priority Valve Management: Primary/Priority valve control closes a Primary/Priority valve during backwash of a filter to increase the flow through the filter being backwashed.
  - e. Alternate Lead Filter, in multiple filter systems, the controller shall automatically alternate the lead filter in each successive backwash cycle, in order to assure an effective full backwash of all filters in the system.
  - f. Backwash duration: Operator settable length of time to backwash each filter.
  - g. Dwell Time: Operator settable length of time to delay after each filter is backwashed.
3. Backwash Holding Tank Management: The controller shall be capable of monitoring the backwash holding tank to prevent overflow, by adjusting the backwash cycle as follows:
- a. Suspend backwash when the holding tank is full, allowing time for the holding tank to drain.
  - b. Automatically resume backwash when the holding tank is empty.
  - c. An operator settable timeout which monitors the amount of time the backwash holding tank takes to drain. If this timeout is exceeded, a limit timer alarm is activated and the backwash cycle cancelled.
4. Advanced Backwash Optimization: The controller shall be capable of the following advanced features as part of the normal backwash programming:
- a. Backwash accessory: Turns on an additional relay before, during, and/or after backwash operations based upon operator settable parameters; useful for sites where application of a dechlorination agent to backwash water (holding tank) is required.
  - b. Water Saving (Turbidity): The controller shall be capable of monitoring backwash effluent turbidity and ending a filter backwash early upon reaching a desired turbidity set point.

- c. Filter Isolation: During backwash suspension due to full backwash holding tank, allows suspended filter to be isolated from the system rather than being returned to filter mode. This prevents the filter bed from recompacting, making the resumed backwash rapidly effective. Requires properly equipped filters.
- H. Main Recirculation Pump
- 1. On/Off Control with Relay:
  - 2. Controller shall provide the capability to interface to and control a recirculation pump with a programmable relay. The controller shall include the following capabilities, available as appropriate based upon installed sensors and implemented features:
    - a. Fireman Switch: The following events shall satisfy Fireman Switch timing requirements prior to turning off recirculation pump:
      - 1) Backwash Operations
      - 2) Energy Conservation mode (24 hr, 7 day function)
      - 3) Manual off
    - b. Immediate: The following events immediately turn off recirculation pump, regardless of Fireman Switch timing requirements:
      - 1) Surge Tank Level Low Alarm: Turn off pump immediately (surge tank is almost empty)
      - 2) Strainer Vacuum High Alarm: Turn off pump immediately (possible entrapment)
      - 3) Emergency shutdown, triggered by front-panel Emergency Off: Turn off pump immediately (per Operator)
- I. Total Dynamic Head (TDH)
- 1. Controller shall provide the capability to continuously monitor the Total Dynamic Head (TDH) of the main recirculation pump, directly calculated by the controller from recirculation pump influent vacuum and filter influent pressure transducers. TDH shall be displayed on the user interface and recorded in data logs, with user-programmable High and Low TDH Alarm settings.
- J. Control Outputs
- 1. Relay Outputs - Solid-State Relays:
 

The controller shall come with a total of 4 integral line or dry contact 5A solid-state relay outputs capable of switching 3A under all normal operating conditions, accounting for the effects of the temperature gradient inside the NEMA 4X enclosure. Systems that utilize relays that are not de-rated must submit an engineering evaluation justifying the use of relays at their full, optimal-condition capacity.
  - 2. Mechanical Relays
  - 3. The controller shall come with a total of 3 mechanical relays:
    - a. 1 integral 8A dry contact mechanical relay, and
    - b. 4 integral 3A dry contact or line powered mechanical relays.
    - c. Since mechanical relays have the inherent risk of failing in the closed (active) position, as a safety measure the controller shall preclude the ability to assign any of the integral mechanical relays to chemical feed functions. Systems that do not

preclude mechanical relays from being configured for chemical feeds shall not be considered equal.

4. Expansion Relay Outputs

- a. The controller shall be capable of expanding the number of relay outputs available by adding up to 3 expansion modules in any combination.

K. Solid-State Relay Expansion Modules

1. Each Solid-State Relay Expansion Module provides 5 integral 5A solid state dry contact or line powered relays capable of switching 3A under all normal operating conditions. Systems that utilize relays that are not de-rated must submit an engineering evaluation justifying the use of relays at their full, optimal-condition capacity.

L. Mechanical Relay Expansion Modules

1. Each Mechanical Relay Expansion Module provides 5 integral mechanical relays:
  - a. 1 integral 8A dry contact mechanical relay, and
  - b. 4 integral 3A dry contact or line powered mechanical relays.
  - c. Since mechanical relays have the inherent risk of failing in the closed (active) position, as a safety measure the controller shall preclude the ability to assign any of the integral mechanical relays to chemical feed functions. Systems that do not preclude mechanical relays from being configured for chemical feeds shall not be considered equal.

M. Safety Features

1. Manual-On limit
  - a. The controller shall have built-in limits to the amount of time any relay control output may be forced on (i.e. in "Manual On" mode). This is an important safety feature to prevent control outputs from inadvertently being left forced on after service or diagnostics.
2. High/Low Alarm Settings & Control Lockouts
  - a. The controller shall have programmable high and low alarm settings for pH, ORP, PPM, temperature, low flow & no flow and chemical overfeed, turbidity, pressure & vacuum, surge tank levels, chemical inventory.
  - b. The controller shall have a programmable lockout of sanitizer feed upon pH high or low alarm.
3. No Flow Alarm & Flow Restored Delay
  - a. The controller shall activate a No Flow alarm when the dedicated sample stream flow switch indicates there is insufficient flow through the sample stream. This No Flow alarm shall lockout all chemical feed control operations.
  - b. The controller shall include a Flow Restored Delay, which shall extend the No Flow lockout user-programmable amount of time after the No Flow alarm ends (i.e. flow is restored). This feature is necessary to assure that the system has valid, stable sensor readings of circulating water prior to making chemical feed control decisions.
  - c. Feed Limit Alarms



- d. The controller shall trigger a Failsafe alarm if a chemical feed relay remains on longer than the programmable Feed Limit Timer. Chemical feeds shall automatically be disabled if the corresponding reading goes into a Failsafe alarm condition.
- 4. Emergency Off
  - a. The controller shall have a dedicated Emergency Off button on the front panel of the system, which immediately halts all chemical feeds and control outputs when pressed. This feature shall be password protectable, which shall require entry of one of the Security passwords.
- 5. Safety Shield
  - a. The controller shall include a safety shield or other mechanism for allowing fuse replacement without access to high voltage circuitry or wiring.
- N. Security
  - 1. The controller shall have three security password levels: six for operators, two for managers and one for the distributor providing for a history of access identified by the user.
- O. Data Logging
  - 1. The controller shall have 512K battery backed-up RAM for input level recording and events. All input level shall be recorded for 10 to 56 days depending on sample rate (2 to 10 minutes).
  - 2. The controller shall record and maintain the latest 1100 events over a maximum of 14 days recording all alarms, parameter changes, user logins, and operational cycles related to all control features
- P. Local Alarms / Indicators
  - 1. The controller shall signal all alarm conditions with the following indicators:
    - a. A bright red flashing LED on the front of the controller,
    - b. Activation of a master alarm signal provided as a dry contact relay enabling the use of 0-240 VAC alarms, and each active alarm listed on the LCD display along with time activated.
- Q. Remote Communication, Access and Alarm Notification
  - 1. Ethernet
    - a. The controller shall come with a standard, integral 100BaseT Ethernet connection. The controller shall be capable of providing Remote Access via PC with Ethernet connection and Alarm Notification via email or text message via an Ethernet connection to the Internet.
- R. Enclosure
  - 1. The controller shall be housed in a NEMA 4X polycarbonate enclosure.
- S. Flow Cell
  - 1. PVC flow cell
    - a. The flowcell shall have a PVC body with two ½" NPT ports for pH and ORP sensors, two ¼" NPT ports for temperature sensor and sensor wash acid injection, and a clear acrylic front viewing window. The flowcell design shall provide precise sample flow

rate and water velocity regulation past the probes. The flowcell shall come provided with PVC ½" isolation ball valves, PVC ¼" wet test valve and standard reed or optional rotary flow switch.

- b. Each flowcell shall be equipped with a pressure-sensing device. The pressure sensor shall consist of a compound pressure/vacuum gauge manufactured in stainless steel, 2 ½" diameter, liquid filled with an operating pressure range of 0 to 60 psig and vacuum of 0 to -30 in./ Hg.

T. Packaged System Enclosure

1. The equipment room controller and flowcell with sensors shall be mounted onto a 3/8" thick PVC backplate. The flowcell shall be completely assembled and reading for integration into the plumbing.

U. AC Surge Suppression

1. An integrated solid-state device shall be furnished to protect each mechanical room control system from excessive line voltage at controller.
2. Device shall be housed in a tamper proof enclosure provided with mounting tabs and have ½" NPT hardwire connection, with LED indicator light, UL listed.

V. Commissioning / Start-Up, Warranty and Manuals

1. Controller and sensing probes (ORP, pH, ppm) shall be covered by a standard manufacturer's 5-year warranty. Manufacturer's representative shall provide a complete set of new probes on the fifth year of operation.
2. The control system shall be provided with on-site start-up, on-site operator training, and 2 years on-site warranty service performed by a factory trained and certified representative of the controller manufacturer.
3. Manufacturer's representative shall supply an Operator's Manual describing system features and operating instructions.

## **PART 3 - EXECUTION**

### **3.01 SURFACE CONDITIONS**

A. Inspection:

1. Prior to installing the items of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
2. Verify that the swimming pool equipment items may be installed in strict accordance with original design, pertinent codes and regulations, and the manufacturers' recommendations.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies are fully resolved.

3. Failure to notify the Owner's Representative's Representative and give written notice of discrepancies shall constitute acceptance by the Installer of existing conditions as fit and proper to receive its Work.

### **3.02 INSTALLATION**

- A. Supply and install items of swimming pool equipment in strict accordance with applicable codes and regulations, the original design, and the manufacturer's published recommendations, anchoring firmly and securely for long life under hard use.
- B. Coordinate with other trades to insure all imbedded items are set plumb and flush. Railing ends must have anchor sockets and escutcheon plates. Be certain that deck equipment and railings are properly bonded prior to imbedding.
- C. All equipment shall be braced and/or anchored to resist a horizontal force acting in any direction using the criteria shown on the Drawings.

### **3.03 INSTRUCTION**

- A. The Contractor shall provide a factory certified representative(s) to start-up and certify proper installation, operation and full warranty status of all swimming pool mechanical equipment. The Contractor shall provide not less than two 8-hour days of on-site training for facility staff in the operation and maintenance of the swimming pool mechanical equipment and systems. The two 8-hour days shall be separated by a minimum of seven calendar days and be completed within the 14-day start-up period.

### **3.04 EQUIPMENT ACTIVATION**

- A. All water chemistry and filtration mechanical equipment shall be operational upon filling of pool after plaster. Chemicals and other related support items as supplied by Contractor, shall be in supply at start-up.
- B. For the first fourteen (14) calendar days after completion of the pool plaster, brush all plastered surfaces at least twice a day and coordinate with General Contractor to ensure that the plaster is carefully maintained after the initial fourteen-day period. In addition, coordinate with the Contractor to ensure that pool filtration equipment is continuously running during the initial fourteen-day period.
- C. Start-up and provide qualified personnel to operate pool equipment for a period not less than fourteen (14) days after the pool is placed in operation, or until the Owner takes occupancy of the facility or letter of substantial completion. During this time, Contractor shall instruct and supervise the Owner's personnel in the various operating and maintenance techniques involved. Contractor shall be responsible for supply of chemicals during this not less than fourteen (14) day period and at time of turnover to Owner, chemical storage tanks shall be full. (Owner's personnel shall be fully trained and capable of assuming swimming pool maintenance tasks, training may begin before Owner takes occupancy).

### **3.05 CLEAN-UP**

- A. Upon completion of swimming pool equipment, remove all debris, materials and equipment occasioned by this Work to the approval of the Owner's Representative.

END OF SECTION



**SECTION 13 11 07**  
**SWIMMING POOL MECHANICAL**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

- A. Swimming pool mechanical piping as indicated on the Drawings for circulation and filtration systems, pool water heating systems, chemical control systems, and appurtenances.
- B. Filter backwash piping to point of connection with backwash retention pit as required.

**1.02 QUALITY ASSURANCE**

- A. Qualifications of Workers:
  - 1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
  - 2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
  - 3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.
- B. Standards:
  - 1. All equipment supplied or work performed shall comply with Chapter 31B of California Building Code, latest edition.
  - 2. Work shall be performed in accordance with the applicable editions of all National, State and local codes, laws, regulations and ordinances, including the following:
    - a. American National Standards Institute (ANSI).
    - b. American Society for Testing Materials (ASTM).
    - c. American Waterworks Association (AWWA).
    - d. American Welding Society (AWS).
  - 3. Do not construe anything in the Drawings or Specifications to permit Work not conforming to these requirements.

**1.03 SUBMITTALS AND SUBSTITUTIONS**

- A. Provide submittals in conformance with the requirements of Section 01 33 00.
- B. Required submittals include:
  - 1. Pipe and Fittings as specified in Article 2.02 of this Section.
  - 2. Valves as specified in Article 2.03 of this Section.
  - 3. Pressure / Vacuum Gauges as specified in Article 2.04 of this Section.
  - 4. Pipe Hangers and Supports as specified in Article 2.05 of this Section.
  - 5. Sleeves and Waterstops as specified in Article 2.06 of this Section.

- C. Submit proof of qualifications as specified in Article 1.03.A of this Section.

#### **1.04 PRODUCT HANDLING**

- A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.
- B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.
- C. Protection: Use all means necessary to protect swimming pool mechanical items before, during and after installation and to protect the installed Work specified in other Sections.
- D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

#### **1.05 JOB CONDITIONS**

- A. Cooperate with entities performing Work specified in other Sections to so that no conflict of new construction or occupied space may occur. Should any installation Work be done without such craft coordination, that Work so installed shall be removed and re-installed.

### **PART 2 - PRODUCTS**

#### **2.01 PRODUCT QUALITY**

- A. Materials and equipment shall be new, of the best quality for the purpose intended, and shall be clearly marked with the manufacturer's name and nameplate data or stamp and rating. As far as practicable, materials and equipment shall be of one manufacturer.

#### **2.02 PIPE AND FITTINGS**

- A. PVC Schedule 40: Type 1, normal impact, NSF approved for solvent welding applications, ASTM Specification D-1785, color shall be white. Dura, Lasco, or approved equal.
- B. PVC Schedule 80: Type 1, normal impact, NSF approved for solvent welding applications, ASTM Specification D-1785, color shall be gray. Dura, Lasco, or approved equal.
- C. CPVC Schedule 80 Influent/Effluent Piping: Type 1, normal impact, NSF approved for solvent welding applications, ASTM Specification D-1785, color shall be gray. Dura, Lasco, or approved equal.
- D. PVC DR25: Conforming to ASTM D-1784, use with epoxy coated bell and spigot-type fittings or epoxy coated mechanical joint by flange adapters with epoxy coated cast iron fittings as specified in Article 2.02 (F), below. Johns-Manville "Big Blue", Diamond Plastics, or approved equal.
- E. Copper Tubing: ASTM Specification B 88, hard drawn, with ANSI Standard B16.22 wrought copper fittings.
- F. Steel: ASTM Specification A-120, Schedule 40 black or galvanized pipe with ASTM A-47 150 lb. banded malleable iron threaded fittings.
- G. Cast Iron: ASTM Specification B16.1, cast iron flanged fittings, provide epoxy coating as required for use with chlorinated water.

## 2.03 VALVES

### A. Ball Valves:

1. For pool system: True-Union design, PTFE seat material with FPM or FKM Double O-ring stem seals, locking handle, NSF certified. PVC schedule 80 body for below grade installation. PVC Schedule 80 body for above grade installation. Furnish ball valves on all pipe diameters 2½" or less with a rating of at least 200psi at 73°F. Asahi, Ipex, or Nibco.
2. For copper pipe system: 3-piece full-port Bronze body valve with Teflon seat, 'Apollo', 'Nibco' or approved equal.

### B. Butterfly Valves:

1. Epoxy coated cast or ductile iron body, 316 stainless steel disc and stem, viton seat material, furnish hand wheel/gear operators on all valves 8" and larger. DeZurick, Keystone, Ipex or equal.
2. PVC body, PVC disc and EPDM construction suitable for chlorinated water applications. Stem shall be of 316 stainless steel and non-wetted. Valves shall be self-gasketed design with a convex sealing arrangement. Valves 1-1/2" – 10" shall be rated to 150 psi and 12" valves shall be rated to 100 psi at 70°F. Asahi Pool-Pro, no known equal.

### C. Check Valves: Wafer-type, epoxy coated cast or ductile iron body, 316 stainless steel plates and shaft, viton seat material. Centerline, Metraflex, or approved equal.

## 2.04 PRESSURE / VACUUM GAUGES

- A. Furnish and install pressure and vacuum gauges on the discharge and suction sides of all pumps. 2" or 2 ½" dial, bottom connection, chrome ring, shut-off cock and snubber. Ranges shall be selected to indicate between mid-point and two-thirds of maximum range under design conditions. Marsh, Trerice, or approved equal.

## 2.05 PIPE HANGERS AND SUPPORTS

### A. General:

1. The requirements of this Section relates to various requirements of the Agreement, General and Supplementary Conditions, Specifications, Drawings, and modifying documents which are part of the Construction Contract. Responsibility for coordination of all such applicable requirements will be that of the Contractor.

### B. Description:

1. This section provides guidelines and limitations for the support of all mechanical, electrical, plumbing or architectural items from the building structure, and for the seismic bracing of such items.
2. Design and install all support and bracing systems as required for the swimming pool systems. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design these systems to not overstress the building structure.

### C. Quality Assurance:

1. Design and install all support systems to comply with the requirements of the California Building Code, Chapter 16A.
2. Seismic bracing is to be designed by a professional engineer licensed in the State of California.

3. For the seismic bracing of mechanical, electrical and plumbing system, refer to "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems" by Sheet Metal and Air conditioning Contractors National Association, Inc., (SMACNA) for guidelines.

D. Submittals:

1. Submit shop drawings for all substructures and attachment methods.
2. Submit proposed alternative methods of attachment for review and approval by the Architects, prior to deviating from the requirements given below.
3. For all pipe hangers and support systems, submit structural calculations and details which include all resultant forces applied to the building structure and are prepared and signed by the Contractor's licensed California professional engineer. Calculations will be reviewed for compliance with design criteria, not for arithmetic.

E. Materials:

1. Use Kin-Line, Grinnel, or approved equal.
2. Support all pipelines individually with hangers, each branch having at least one hanger. Lateral brace as noted and required.
3. Support piping near floor with steel stanchions welded to end plates secured to pipe and floor.
4. Support vertical piping at each floor level. Install coupling in piping at each support. Coupling shall rest on and transmit load to support. Isolate copper from steel supports with vinyl electrician's tape around pipe and coupling.
5. Use Stoneman "Trisolator," Unistrut, or approved equal, isolators at each hanger and other support points on bare copper tubing system.
6. For PVC pipe, space hangers four (4) feet apart for pipe sizes 1" and under, five (5) feet apart for pipe sizes 1-1/4" to 2", and six (6) feet apart for pipe sizes over 2". Space hangers for horizontal pipes at a maximum of six (6) feet for copper 2" and smaller and for steel 1-1/4" and smaller; ten (10) feet for copper 2-1/2" and larger and for steel 1-1/2" and larger.
7. Size hanger rods, screws, bolts, nuts, etc., according to manufacturer's sizing charts.
8. Trapeze hangers may be used for parallel lines.
9. Use galvanized or cadmium plated hangers, attachments, rods, nuts, bolts, and other accessories in pool mechanical room, high humidity areas, or where exposed to weather. Hot dip galvanize all items which are not factory furnished. Plating for hinged movements must be done at the factory.
10. Lateral Bracing: To prevent swaying of the piping systems, provide angle iron bracing and anchor into wall or overhead framing. Piping shall be braced or anchored in such a way as to resist a horizontal force of 50% of its operating weight in any direction.
11. Do not use wire or other makeshift devices for hangers.
12. Furnish all substructures and fasteners required to comply with the limitations given below. Use material as specified in the various sections and as appropriate to their use.

F. Guidelines & Limitations:



1. Each Contractor will coordinate the load requirements from all subcontractors so that no combination of loads overstresses the building structure or exceed the limitations given below.
  2. Concrete Structure:
    - a. Support all loads hung from concrete structure with cast-in-place inserts, unless drilled-in anchors are specifically approved in writing prior to placing the concrete.
    - b. Concrete anchors must not penetrate into reinforcing bars. Where the anchors boring indicates the presence of reinforcing bar, patch hole with an epoxy type grout and relocate anchor 12 diameters away.
    - c. Individual expansion anchors cannot support any loads greater than 300 pounds or manufacturer's specified load capacity without approval.
  3. Steel Structure:
    - a. Hang no more than 20 pounds per metal deck rib in any span.
    - b. At beams, hang all beam loads greater than 40 pounds concentric to beam, not off the flanges.
      - 1) Attached no loads to the beams or girders greater than the following without specific approval from the architect;
      - 2) Roof beams and girders: 300 pound point load or 600 pound total load for a single span.
- G. Seismic Bracing:
1. Design and install seismic bracing to not ground out vibration and sound isolation systems.
  2. All items of mechanical and electrical equipment 60" or more in height are to be seismically braced whether such bracing is shown or not.

## **2.06 SLEEVES AND WATERSTOPS**

- A. Provide sleeves where work of this Section passes through fire rated partitions, floors and ceilings, concrete slabs or exterior of structure. Caulk clearance space using sealant appropriate for application in conformance with manufacturer's recommendations and Title 24 of California Code of Regulations. 3m, Dow Corning, or approved equal. In lieu of sleeves and caulking, "Link Seal" products may be used.
- B. Provide prefabricated waterstops as indicated on the Drawings at all pipe penetrations through structures containing stored water (i.e., swimming pools, balance/surge tanks, etc.) to insure leak-proof seals.

## **PART 3 - EXECUTION**

### **3.01 SURFACE CONDITIONS**

- A. Inspection:
  1. Prior to Work of this Section, carefully inspect the installed Work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that items of this Section may be installed in accordance with the original design and referenced standards.
- B. Discrepancies:
1. In the event of discrepancy, immediately notify the Owner's Representative.
  2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
  3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive his work.

### **3.02 ABBREVIATIONS AND SYMBOLS**

- A. Abbreviations and symbols on the Drawings are those most commonly used. Obtain clarification from the Owner's Representative on any questionable items before bid.

### **3.03 GENERAL PIPING REQUIREMENTS**

- A. Size any section of pipe for which size is not indicated or any intermediate section erroneously shown undersized the same size as the largest pipe connecting to it. Sizes listed are nominal.
- B. Cut pipe accurately to job measurements and install without springing or forcing, true to line and grade, generally square with building and/or structures and adequately supported to prevent undue stress on pipe, fittings and accessories.
- C. Make changes of direction with manufactured fittings. Street ells, bushings, reducing flanges, close nipples or bending of pipe is not allowed.
- D. Use great care to install piping in accordance with best practice. Plastic pipe shall be "snaked" in trenches to allow for thermal expansion.
- E. All above grade, below grade and buried or imbedded PVC shall be installed using solvent weld fittings. Also, each and every fitting and pipe end shall be prepared with solvent primer. Fittings shall be joined individually and with enough time between assembly of adjacent joints to allow them to seal solidly. After joining, an even ring of primer must be visible around the entire fitting. If any fittings are installed without visible primer, the fitting shall be removed and discarded and piping recut, rechamfered and joint made up again using a new fitting. All procedures, methods and techniques used to make up solvent weld joints shall be in strict accordance with manufacturer's recommendations.
- F. Arrange pipe and hangers to allow for expansion, contraction and structural settlement. No pipe shall contact structure except penetrations as shown on the Drawings.
- G. Provide dielectric connections between copper and dissimilar metals. In copper systems, threaded piping. Including connections to equipment shall be brass pipe and fittings. Install dielectric connections in vertical sections of piping only.
- H. Run pipe full size through shut-off valves, balancing valves, etc. Change pipe size within three (3) pipe diameters of final connection to control valves, fixtures and other equipment.
- I. Provide unions or flanges at connections to equipment, on service side of valves and elsewhere as required to facilitate ease of maintenance.
- J. Locate equipment shut-off valves as close to equipment as possible maintaining easy valve access.

### **3.04 GENERAL EQUIPMENT REQUIREMENTS**

- A. Position equipment to result in good appearance and easy access to all components for maintenance and repairs.
- B. Install piping, flues, breeching and ducts so that they do not interfere with equipment access.
- C. Install level, secure and out of moisture. Provide shims, anchors, support straps, angles, grouted bases, or other items as required to accomplish proper installation.
- D. All screws, nuts, bolts and washers shall be galvanized, cadmium plated or stainless steel. After fabrication, hot-dip galvanize unfinished ferrous items for outdoor, below grade or other use subject to moisture.

### **3.05 VALVES AND STRAINERS**

- A. If no shut-off is indicated, provide ball valves at inlet connections and balance valves at outlet connections to fixtures and equipment. Provide proper valve trim for service intended.
- B. Use no solder end valves unless noted otherwise; provide adapters in copper tubing systems.
- C. Locate valves with stems above horizontal plane of pipe. In general, locate valves within six (6) feet of floor, out from under equipment, in accessible locations with adequate clearance around hand wheels or levers for easy operation.
- D. Provide all valves, cocks and strainers, full pipe size unless indicated otherwise.
- E. Provide hand wheel operators on all valves 6" and larger, under 6" lever operators may be used.
- F. Provide tool operated valve with stainless steel shaft extension and 'on deck' tool operation for surge chamber butterfly isolation valve.

### **3.06 IDENTIFICATION OF PIPING**

- A. Identify each valve by a numbered brass tag with hole and brass chain mounted on valve stem or handle. Tag to be a minimum of 1" in diameter and numbers at least 1/4" high stamped into tag. Valves and plumbing lines shall be labeled clearly with the source or destination descriptions.
- B. Install an identification chart in a plastic or glass framed enclosure, which schematically illustrates the proper operation of all piping systems and indicates number and location of all valves and control devices within the system.
- C. The direction of flow for the recirculation equipment shall be labeled clearly with directional symbols such as arrows on all piping in the equipment area. Where the recirculation equipment for more than one pool is located on site, the equipment shall be marked as to which pool the equipment serves.

### **3.07 TESTS**

- A. Perform tests in presence of Owner's Representative with no pressure loss or noticeable leaks.
- B. Do not include valves and equipment in tests. Include connection to previously tested sections if systems are tested in sections.
- C. Perform tests as follows:

System	Test Pressure	Test Medium	Duration
Skimmer Lines and Lawson Main Drain Sump Lines	20psig	Water*	4 hours
Pool Piping	50 psig	Water*	4 hours
Pool Main Drains	30 psig	Water*	4 hours
Domestic Water	150 psig	Water*	4 hours

\*Never test PVC pipe or fittings with air or other gases, always use water.

### 3.08 PIPE MATERIAL APPLICATION

- A. PVC Schedule 40: Below grade swimming pool piping and domestic water piping up to 12" line size; use standard solvent weld fittings.
- B. PVC Schedule 80: Above grade swimming pool piping up to 12" line size; use solvent weld Schedule 80 or epoxy coated cast iron fittings.
- C. Type L Hard Copper: Above grade domestic water piping.
- D. CPVC Schedule 80; Pool Heater Piping.

### 3.09 CUTTING AND DRILLING

- A. Cutting or drilling necessary for installation of Work of this Section shall be done only with approval of Owner's Representative.

### 3.10 CLOSING-IN OF UNINSPECTED WORK

- A. Do not cover or enclose Work before testing and inspection. Re-open Work prematurely closed and restore all Work damaged.

### 3.11 QUIETNESS

- A. Quietness is a requirement. Eliminate noise, other than that caused by specified equipment operating at optimum conditions, as directed by Owner's Representative.

### 3.12 FLUSHING OF LINES

- A. Flush or blow out pipes free from foreign substances before installing valves, stops or making final connections. Clean piping systems of dirt and dust prior to initial start-up.
- B. Just prior to plastering the pool, under the observations of the IOR, the pool mechanical system shall be flushed using the pool circulation pump. Circulate water through the mechanical system until the effluent water from the pool return heads runs clean.

### 3.13 CLEAN-UP

- A. After all Work has been tested and approved, the Swimming Pool Subcontractor shall thoroughly clean all parts of the equipment installations, including all pool pipe and fittings in the pool mechanical room. Exposed parts shall be cleaned of cement, plaster and other materials and all grease and oil spots removed with solvent.

- B. The Swimming Pool Subcontractor shall remove debris from the Project site. Cartons, boxes, packing crates and excess materials not used, occasioned by this work shall be disposed of to the satisfaction of the Owner's Representative.
- C. If the above requirements of clean up are not performed to the satisfaction of the Owner's Representative, the Owner reserves the right to order the work done, the cost of which shall be borne by the Swimming Pool Subcontractor.

END OF SECTION

**SECTION 13 11 08**  
**SWIMMING POOL ELECTRICAL**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

- A. Provide labor, materials and equipment as required to install the swimming pool electrical system including but not limited to:
  - 1. A complete and operable system of service equipment, switchboards, panelboards, conduits, switches, time clocks and wiring for power and lighting, motor control centers.
  - 2. Junction and/or pull boxes, conduits, disconnects, starters, contactors, wiring and connection of all motors and mechanical equipment, including connection and wiring of line voltage controls associated with the mechanical systems.
  - 3. Complete grounding system as required and shown on the Drawings.
  - 4. Complete equipotential bonding system as required and shown on the Drawings.
  - 5. Adjusting and preliminary operation of the completed electrical system as described in Article 3.6, A of this Section.
  - 6. Cleaning of all completed Work and installation adjustment of all trim and decorative items.

**1.02 QUALITY ASSURANCE**

- A. Qualifications of Workers:
  - 1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
  - 2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
  - 3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.
- B. Ordinances and Codes: Materials and construction shall conform with all applicable code requirements, including:
  - 1. California Electrical Code, 2019 edition; Electrical Safety Orders of the State of California; Department of Industrial Relations; regulations of the State Fire Marshal; rules and regulations of the Board of Underwriters of the Pacific, UL 50, 50E and NEMA 250 rating.
  - 2. Chapter 31 of California Building Code, 2019 edition.
- C. Verification of Conditions:
  - 1. The locations shown on the Drawings are diagrammatic only and the exact finish location of equipment and materials cannot be indicated. Therefore, locations of all Work and equipment shall be verified to avoid interferences, preserve head room and keep

openings and passageways clear. Changes shall be made in locations of equipment and materials which may be necessary to accomplish these purposes.

- D. Preliminary Operations and Testing:
  - 1. Motor driven equipment shall be tested for correct rotation and completion of all connections.

### **1.03 SUBMITTALS AND SUBSTITUTIONS**

- A. Provide submittals in conformance with the requirements of Section 01 33 00.
- B. Required submittals include:
  - 1. Conduit and Fittings as specified in Article 2.02 of this Section.
  - 2. Panelboards as specified in Article 2.06 of this Section.
  - 3. Circuit Breakers as specified in Article 2.07 of this Section.
  - 4. Motor Starters as specified in Article 2.10 and 2.11 of this Section.
  - 5. Fuses as specified in Article 2.13 of this Section.
  - 6. Time Clocks as specified in Article 2.14 of this Section.
  - 7. Ground Fault Circuit Interrupters as specified in Article 2.15 of this Section.
  - 8. CEC required corrosion resistant enclosures, cabinets and boxes as specified in Article 2.08, 2.11, 2.16 & 2.18 of this Section
- C. Submit proof of qualifications as specified in Article 1.02.A of this Section.

### **1.04 PRODUCT HANDLING**

- A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.
- B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.
- C. Protection: Use all means necessary to protect swimming pool electrical materials before, during, and after installation and to protect the installed Work specified in other Sections.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS, GENERAL**

- A. Materials shall be new, in unbroken packages and bear the U.L. label of approval.
- B. Equipment of one type shall be by same manufacturer. One type of equipment for classifications such as:
  - 1. Switchboards, panels, buss duct, disconnect switches and allied items.
  - 2. Conduit.
  - 3. Wire.
  - 4. Conduit fittings.
  - 5. Fixtures of the same general type.
  - 6. Wiring devices.

## **2.02 CONDUIT AND FITTINGS**

- A. Conduit within or under buildings or where exposed outdoors shall be rigid metal threaded, hot dipped, galvanized, or U.L. approved plastic except where noted otherwise on the Drawings. Metallic conduit shall be of the same metal between outlets or terminals.
- B. Use flexible metallic conduit only for short connections of motors and where specifically called for on Drawings. Maximum length shall be 40". Use only liquid tight flexible metal conduit. Install an unbroken #12 AWG insulated copper grounding conductor in each liquid tight flexible conduit with permanent connection at motor junction box and service panel ground.
- C. Protect, before installation, metallic conduit runs in all slabs laid on grade or in contact with the earth or exposed in damp locations, with two (2) heavy coats of asphaltum rust-resisting compound.
- D. Encase conduits 2-1/2" or larger run underground, outside, or under buildings, in concrete envelopes a minimum of 3" thick, except as indicated otherwise on Drawings or stubouts. Conduits 2 and smaller laid 18" below finish surface in soil.
- E. Low voltage runs underground outside buildings, 1-1/4" or smaller, may be G.I. or sherardized steel conduit, with machine applied wrapping equal to double wrap or Scotch-Wrap #50 tape, half lapped and quadrupled at joints in lieu of concrete encasement.
- F. Service conduits through foundations or concrete members shall run through metal sleeves with adequate clearances for full movement of the conduit. Do not run conduits through footings.
- G. Secure conduits run exposed on surfaces with one hole heavy-duty straps or fasten with matching fittings to inserts or trapezes, parallel to building walls and ceilings.
- H. Cap all conduit or duct stub-outs with standard factory caps; except cap threaded steel conduit with B.I. water pipe caps in outdoor locations.
- I. Use conduit fittings as manufactured by Crouse-Hinds Company, Appleton Electric Co., or approved equal.
- J. Employ U.L. liquid tight fittings for use with liquid tight flexible metal conduit.
- K. Use unions as manufactured by Appleton, O-Z/Gedney, or approved equal. The use of running threads will not be permitted.
- L. Exposed conduit and fittings in chemical rooms shall be nonmetallic rigid polyvinyl chloride, corrosion resistant rated suitable for installation in corrosive environments and in accordance with the latest CEC requirements.

## **2.03 EQUIPOTENTIAL BONDING / GROUNDING**

- A. Bond together and ground to a common ground at a single point all metallic conduit, piping systems, pool reinforcing steel, metal parts of ladders, lifeguard stands, handrails and their supports and the like. The solid copper bonding conductor shall not be smaller than #8 copper.

## **2.04 WIRING CONNECTIONS**

- A. Make connections without strain on conductors, allowing the conductors to take a natural position after connections or taps are made. Include all strand of wire in making the connection.



- B. Make connections for wiring by one of the following means:
1. Make all taps or connections to conductors with compression type connectors except those smaller than #8 B&S gauge may have soldered connections. Solderless connections for #10 AWG or smaller may be used and shall be "Scotchlok", Buchanan, or approved equal. For #8 AWG or larger, they shall be T&B "LockTite", Burndy "Versitaps", or approved equal.
  2. All cable or conductor terminal lugs shall be Burndy "Quicklug", IlSCO, or approved equal. Two-piece stamped lugs and solder lugs will not be approved.
  3. Paint taped splices in damp or outdoor locations with two (2) coats of insulating paint.
  4. Tag all branch circuit wires with circuit number at the panelboard and at each point of use with linen or plastic tags.

## **2.05 CONDUCTORS**

- A. Copper RHW or THW. Do not make splices between boxes.

## **2.06 COLOR CODING**

- A. Neutrals (identified conductors shall be white).  
B. Phase conductors shall be red for phase B; blue for phase C.  
C. Green shall be used for mechanical equipment and receptacle grounds only.

## **2.07 MOTOR WIRING**

- A. Make final connections to motors with the required AWG (Minimum #12), Flamenol machine tool wire, 19 strand. Control wiring for equipment shall be Flamenol machine tool wire, 19 strand of required AWG. Provide corrosion resistant junction boxes at each item of equipment to change from standard building wiring to machine tool wire.  
B. Phase motors as proper in direction of rotation.

## **2.08 PANELBOARDS**

- A. Panelboards shall be flush or surface mounting as indicated with circuit breakers as shown on panel schedule, hinged lockable doors, index card holders and proper bussing.  
B. Where indicated on the drawings, panelboards shall be furnished with subfeed breakers and/or lugs, split bussing, contractors, time switches, relays, etc., as required.  
C. All panelboards shall be keyed alike.  
D. All panelboard enclosures shall be corrosion resistant rated in accordance with the 2019 NEC requirements.  
E. Furnish corrosion resistant panelboard enclosures and terminal cabinets with Yale 46515 flush locks and LL806 keys except where indicated otherwise herein. Fasten the trim to panel boards and terminal cabinet by means of concealed, bolted or screwed fasteners accessible only when the door is open.  
F. Panelboards 208/120 volt, three phase, 4 wire, S/N or 120/240 volt, single phase, 3 wire, S/N.

Panelboard types as manufactured by:

Westinghouse	Type B10B
General Electric	Type NLAB
Square D	Type NQOB

- G. Panelboards for 480/277 volt, three panes, 4 wire, S/N.

Panelboard types as manufactured by:

Westinghouse	Type Pow-R-Line 2
General Electric	Type AE
Square D	Type NEHB
Sylvania	Type NH1B
I.T.E.	Type Approved Equal

- H. Panelboard for bussing sizes thru 400 amp shall be 20" wide surface mounted type. Recess mounted type shall have a 20" wide (maximum) recess metal enclosure with trim plate cover extending 1" on all sides of enclosure. Depth shall be 5-3/4" nominal. Height of panel as required for devices.
- I. Provide 6" additional gutter space in all panels where double lugs are required, or where cable size exceeds bus size. Minimum bottom gutter space shall be 6" high. 12" additional gutter space may be required for aluminum feeders where used.
- J. Panelboards shown on the drawings with relays, time clocks or other control devices shall have a separate metal barriered compartment mounted above panel with separate hinged locking door to match panelboard. Provide mounting sub-base in cabinet for control devices and wiring terminal strips.
- K. Panelboard shall have a circuit index card holder removable type, with clear plastic cover. Index card shall have numbers imprinted to match circuit breaker numbers.

## **2.09 CIRCUIT BREAKERS**

- A. Breakers shall have a minimum short circuit interrupting rating of 10,000A symmetrical for panelboard voltage thru 240 volt and 14000A for panelboards thru 600 volts or as specified on the drawings. In no case shall the interrupting rating be less than the bus withstand rating unless noted otherwise on the drawings.
- B. Circuit breakers as manufactured by the following companies only are acceptable:
1. General Electric Company
  2. Square D Company
  3. Westinghouse Company
  4. I.T.E. Company
- C. Circuit breakers shall be arranged in the panels so that the breakers of the proper trip settings and numbers correspond to the numbering in the panel schedules on the drawings. Circuit numbers of breakers shall be black-on-white micarta tabs or other previously approved

method. Circuit number tabs which can readily be changed from front of panel will not be accepted. Circuit number tabs shall not be attached to or be a part of the breaker.

- D. Where two or three pole breakers occur in the panels, they shall be common trip units. Single pole breakers with tie-bar between handles will not be accepted.
- E. All circuit breakers shall be padlockable in the "off" position. Locking facilities shall be riveted or mechanically attached to the circuit breaker (submit sample for approval). Other means of attachment shall not be accepted without prior written approval of Architect.
- F. Where branch circuit breakers supply the power to motors and signal systems, the breakers shall be furnished with lockout clips, mounted in the "on" position. The breakers shall be able to trip automatically with lockout clips in place.
- G. Panelboard circuit breakers shall be bolt-on type.

## **2.10 BUSSING**

- A. Bussing shall be rectangular cross section copper, or full length silver or tin-plated aluminum.
- B. Bussing shall be braced to withstand symmetrical short circuit ratings as follows or as noted on drawings. In no case shall bus short circuit bracing be less than specified circuit breakers.
- C. Each panelboard shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

## **2.11 POOL MECHANICAL EQUIPMENT ENCLOSURES, TERMINAL CABINETS & MISC CABINETS**

- A. All pool mechanical equipment enclosures, terminal cabinets and miscellaneous cabinets in the pool mechanical room or chemical storage rooms shall be corrosion resistant rated in accordance with the 2019 CEC requirements. Enclosures and all cabinets shall be flush mounted (except where noted a surface) of the size indicated on the drawings, and complete with hinged lockable doors and the number of 2-way screw terminals required for termination of all conductors. Terminal cabinet locks to operated form same key used for panelboards. The trim to terminal cabinets shall be fastened by means of concealed bolted or screwed fasteners accessible behind door to terminal cabinets. Terminal cabinets shall have 5/8" plywood backing.
- B. Provide engraved nameplate on each enclosure and cabinet indicating its designation and system (i.e., Swimming Pool - Panel 'SP').

## **2.12 MOTOR CONTROL INDIVIDUAL STARTERS**

- A. Manual Motor Starters:
  - 1. Provide flush or surface mounting manual motor starters with number of poles and size of thermal overload heaters as required for the motor being controlled (equipped with overload heaters, one for each motor lead). Back boxes shall be supplied with all flush mounting starters whether they are toggle type requiring only a 4" square outlet box or the larger type requiring a special box and cover designed to accept the particular unit. All box types shall be corrosion resistant rated in accordance with the 2019 CEC requirements

2. Unless otherwise noted on the drawings, all manual starters for single phase motors, smaller than 1 h.p., shall be the compact toggle type. Manual starters for all single phase motors, 1 to 5 h.p., and all three phase motors up to 5 h.p. shall be the heavy duty type.
3. Where manual motor starter is shown with pilot light, the pilot light shall be installed in a separate outlet box adjacent to the starter outlet, and engraved nameplate in indicate function of pilot light.
4. The following motor starters as manufactured by:

Manufacturer	Single Phase 1HP and Below	Others
Arrow Hart	Type RL	Type LL
General Electric	CR 101	Class CR 1062
I.T.E.	Class C10, C11 or C12	Class C20
Square D Company	Class 2510, Type A	Class 2510, Type B & C
Westinghouse	Type MS	Type A100
Allen Bradley	Approved Equal	Approved Equal.

B. Individual Magnetic Motor Starters:

1. Magnetic motor starters shall be A.C. line voltage, across-the-line units in corrosion resistant rated enclosure in accordance with the 2019 CEC requirements.
2. All starters located outside of a building whether or not indicated shall be W.P. (weatherproof), and all starters noted W.P. shall be furnished in corrosion resistant rated enclosure in accordance with the 2019 CEC requirements.
3. Starter shall be horsepower rated for the motor controlled, and shall be equipped with properly sized overload elements. Every pole shall be with overload element.
4. Verify the exact motor current and voltage characteristics with the Contractor supplying the motor before installation of a starter.
5. Each starter shall be equipped with "Hand-Off-Auto" switch or stop-start pushbutton as required.
6. Coils shall be designed to operate on voltage indicated on control diagrams and have built-in-under the voltage release for coil circuit to drop motor starter off the line when the line voltage drops below normal operating voltage.
7. The coil control circuit shall be independently fused, sized to protect coil.
8. Starters to be equipped with running pilot light indication with a "Push-to-Test" feature.
9. Magnetic starters shall have a minimum of two auxiliary contacts. Additional auxiliary contacts shall be provided as required to comply with the requirements of the wiring diagrams on the electrical and mechanical drawings and the description of the function in the Mechanical Section of the Specifications.
10. Minimum starter size shall be NEMA size I unless indicated otherwise.
11. The following types of magnetic motor starters as manufactured by:

Manufacturer	Type
General Electric	Class CR 106
I.T.E.	Class A20
Square D Company	Class 8536
Westinghouse	Type A200 (Size 4 Max.) or Class II-200 (Sizes 5-8)

### 2.13 INDIVIDUAL COMBINATION MOTOR STARTERS

- A. Combination starter shall incorporate fused disconnect switch and individual magnetic motor starter in a common enclosure. Combination starters shall be mounted in corrosion resistant rated enclosure in accordance with the 2019 CEC requirements.
- B. Starters shall comply with NEMA standards, size and horsepower as indicated on drawings General Electric, Square D, Westinghouse or I.T.E.
- C. The disconnect handle used on combination starters shall control the disconnect device with the door opened or closed. The disconnect handle shall be clearly marked as to whether the disconnect device is "ON" or "OFF", and shall include a two-color handle grip, the black side visible in the "OFF" position indicating a safe condition, and the red side visible in the "ON" position indicating an unsafe or danger condition.
- D. All starters used in combination starters shall be manufactured in accordance with the latest published NEMA standards, sizes, and horsepower ratings. These starters shall be furnished with three melting alloy type thermal overload relays.
- E. Thermal units shall be of one-piece construction and interchangeable. The starter shall be inoperative if a thermal unit is removed.

### 2.14 MOTOR CONTROL CENTER, INTERLOCKS AND CONTROL DEVICES

- A. Refer to mechanical and plumbing drawings and specifications and provide all control devices including timeswitches, relays and interconnection of starters of required.
- B. Mount all relays and timeswitches in a separate compartment in motor control center unless otherwise indicated.
- C. Whether shown on mechanical and plumbing drawings or control center schedules or not, where motors are controlled by external devices (i.e., thermostats, relays, float or pressure switches, etc.) or interlocked with other motors, each motor starter to be equipped with a "Hand-Off-Auto" selector switch in starter cover. Other starters equipped with a "Start/Stop" pushbutton station in starter cover. The Contractor shall be responsible to submit a complete and detailed set of shop drawings, electrical schematic design along with electrical component cut sheets from the MCC panel or the interlock control device manufacturer. RSD Total Control: Allan Pearson 949-380-7878, South Coast Controls: Anthony Ellis 714-998-5656 or approved equal.

## **2.15 FUSES**

- A. Fuses shall be dual element, current limiting type, U.L. Class RK5 unless otherwise indicated on the drawings. Provide one spare set of fuses of each size and type in each motor control center.

## **2.16 TIME CLOCKS**

- A. Time clocks shall be provided for all underwater lighting systems and swimming pool circulation pumps not controlled by filter microprocessors.
- B. Contacts shall have a minimum rating of 40 amperes at 277V.
- C. Timing motor shall be heavy duty synchronous, self starting, high torque type, and shall be rated at 120, 208, 240, 277 volt 60 Hz.
- D. Motor shall operate normally at temperature range of -60 degrees Fahrenheit to +120 degrees Fahrenheit.
- E. Dial shall be 3" diameter, clearly calibrated with day/night zones and 24 hour rotation, with gear to provide one revolution yearly which automatically varies the on/off settings each day according to seasonal changes. Day and month of the year shall show clearly through calendar window on the dial.
- F. Time clocks shall be equipped with 7-spoke omitting wheel marked with days of the week.
- G. Time clocks shall be housed in a corrosion resistant rated enclosure in accordance with the 2019 CEC requirements.
- H. Acceptable manufacturers are Intermatic, Tork, Paragon, or approved equal.

## **2.17 GROUND FAULT CIRCUIT INTERRUPTERS**

- A. Minimum rating shall be 20 amperes, 125V, 5 milliampere trip setting, Class A per UL943.
- B. Manufacturer to be Crouse-Hinds, Leviton, or approved equal.

## **2.18 BOXES**

- A. Boxes shall be of the size required by ordinances or larger, must be corrosion resistant in accordance with the 2019 CEC requirements and of pressed galvanized code gauge steel where concealed or exposed on ceilings. Exposed boxes on walls below 7'6" shall be cast steel similar to "FA" condulets.
- B. Outlets to be surface where wiring is exposed and flush in areas where conduit is concealed.
- C. Provide surface outlets with proper corrosion resistant surface covers. Box and cover shall be deep enough to provide at least 1/4" clearance between back of device and back of box. Where box contains more than one device, use corrosion resistant rated gang box with proper cover in accordance with the 2019 CEC requirements. Surface outlet boxes shall be of the threaded hub type wherever below 8'0".
- D. If necessary for cable installation, additional pull boxes or junction boxes may be installed in accessible locations. Exposed pull boxes and junction boxes shall be corrosion resistant rated in accordance with the 2019 CEC requirements.
- E. Provide exposed junction boxes with proper flat blank galvanized cover. If necessary for cable installation, additional pull boxes or junction boxes may be installed in accessible locations.

- F. Where exposed to weather pull boxes larger than outlet boxes are required, galvanized code gauge sheet steel boxes may be used with covers attached by brass machine screws. Boxes exposed to the weather shall be approved for the purpose, and conduit entrances shall be on the bottom made by means of an interchangeable hub with gasket and adapter nut. Pull boxes not shown on Drawings may be added only after approval of size and location is obtained.
- G. For outlets exposed to weather or where noted, cast outlet boxes shall be Crouse-Hinds, Appleton, or approved equal. Boxes shall have proper number and size hubs. Device plates, covers, adapters and boxes shall be as manufactured by Crouse-Hinds, Appleton, or approved equal.
- H. Exposed junction boxes, outlet boxes and pull boxes for pool chemical rooms shall be nonmetallic suitable for a corrosive environment and in accordance with the 2019 CEC requirements.

## **2.19 IDENTIFICATION MARKINGS**

- A. Plainly mark all motor and electrical appliance control equipment indicating the equipment controlled with engraved metal tags.
- B. Provide laminated plastic nameplates on panelboards on the outside of the door at the top indicating panel designation and feeder source.
- C. Provide laminated plastic nameplates on distribution switchboards and motor control centers at the top center indicating panel designation and feeder source.
- D. Identify each distribution switchboard and motor control center circuit breaker with a laminated plastic nameplate indicating its' use.
- E. Type panelboard directories on the forms provided with the equipment, indicating the use of each branch circuit breaker.
- F. Fasten all laminated plastic nameplates to surfaces with two (2) or more screws.

## **PART 3 - EXECUTION**

### **3.01 INSPECTION**

- A. Verify conditions at the Project site before submitting bid. Be responsible for providing all necessary wiring for the new electrical systems. Wherever wiring is being disrupted due to remodeling or changes, reconnect existing and provide new wiring circuits to accomplish a fully operable system at no additional cost to the Owner.

### **3.02 COORDINATION**

- A. The Drawings are essentially diagrammatic and indicate the desired location, size, routes, connection points, etc., and are to followed as closely as possible. Proper judgment must be exercised in executing the Work so as to provide the best possible installation in the available space and to overcome difficulties, limitations or interference wherever encountered. Be responsible for the correct placement of this Work, the proper location and connection in relation to Work of other trades, for determining the exact location of all conduits, outlets and equipment, and for installing the conduits in such a manner as to conform to the structure, avoid obstruction, preserve headroom and keep openings and passageways clear. Particular attention is directed to the close coordination required on exposed Work. Locations shown on

Architectural or Mechanical Drawings if different than those shown on Electrical Drawings should be communicated to the Owner's Representative in writing for clarification.

### **3.03 INSTALLATION**

- A. Trenching and Backfill: Conform with requirements of Section 13 11 01. Provide minimum cover as required by Code.
- B. Conduit Installation:
  - 1. Conduit and metallic raceway systems shall be mechanically and electrically continuous from sources of current to all outlets in a manner to provide a continuous grounding path. Close ends of conduit during construction to prevent entrance of dirt or moisture.
  - 2. Securely fasten conduit to the building construction within three feet of each outlet and within every ten feet thereafter. Secure it to boxes, cabinets, pull boxes, terminals with two locknuts and ends equipped with bushings or a terminal fitting. Cut square with ends carefully reamed.
  - 3. Make bends or elbows so that the conduit will not be injured or flattened.
  - 4. Use insulated metallic bushings in all places where bushings are required.
  - 5. Run exposed conduits level or plumb and parallel to the construction members of the building. No cutting across or diagonal runs will be permitted. Neatly surmount structural obstructions encountered on conduit runs by the use of fittings or pull boxes.
  - 6. Identify feeder conduits by stamped metal tags secured to exposed section of conduit in main or sub-panels.
  - 7. Make up all threaded conduit joints gas and watertight with conductive sealer except conduit above ground in dry indoor locations.
  - 8. Rigidly support all boxes independently of the conduit system.
- C. Connections to Equipment:
  - 1. Fully connect, in an approved manner, all electrical outlets, apparatus, motors, equipment, fixtures, wiring devices and appliances whether they are installed under the Electrical Contract or not, which require electrical connections, to the corresponding electrical system outlet.
  - 2. Where the Work of this Section requires connections to be made to equipment that is furnished and set-in-place under other Sections, obtain such roughing-in dimensions from the manufacturer or supplier of each item as required and assume full responsibility for the installation of the connections thereto.

### **3.04 ADJUSTMENT AND CLEAN-UP**

- A. Preliminary Operation: Should the Owner's Representative deem it necessary to operate the electrical installation or any part thereof prior to Substantial Completion of the Work, consent to such preliminary operation and supervise conduction of same. Subcontractor shall pay all costs occasioned by such operation. Preliminary operation shall not be construed as an acceptance of any Work installed under this Contract.
- B. Clean-up: Upon completion of the Work of this Section, immediately remove all swimming pool electrical materials, debris and rubbish occasioned by this Work to the approval of the Owner's Representative.



END OF SECTION

**SECTION 22 40 00  
PLUMBING FIXTURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Emergency showers.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ANSI Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment.
- C. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices.
- D. NSF 61 - Drinking Water System Components - Health Effects.
- E. NSF 372 - Drinking Water System Components - Lead Content.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in District's name and registered with manufacturer.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Water Efficiency: EPA WaterSense label is required for all water closets, urinals, lavatory faucets, and showerheads.

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## 2.02 REGULATORY REQUIREMENTS

- A. Comply with California codes for installation of plumbing systems.
  - 1. Plumbing fixtures and accessories provided in a toilet room or bathing room required to comply with CBC Section 11B-213.2 shall comply with CBC Section 11B-213.3. Each toilet shall comply with Section 11B-603.
  - 2. Accessible plumbing fixtures shall comply with all the requirements in CBC Division 6 - Plumbing Elements and Facilities.
  - 3. Clearance around accessible water closets and in toilet compartments shall be 60 inches minimum measured perpendicular from the side wall and 56 inches minimum measured perpendicular from the rear wall per CBC Section 11B-604.3.1.
  - 4. Heights and location of all accessible fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.
  - 5. Accessible fixture controls shall comply with CBC Section:
    - a. 11B-608.5 for showers.
    - b. 11B-309.4 force required to activate any operable parts, such as faucets, and other operable parts, shall be 5 lbs. maximum.
    - c. 11B-309.4 for faucets, and other operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist.
  - 6. For mounting height installation of plumbing fixtures, refer to architectural plans.
  - 7. Depth of lavatories, sinks, or drainpipes shall not interfere with knee and toe clearance provided in accordance with CBC Section 11B-306 when a forward approach is required. CBC Sections 11B-606.3 and 11B-606.7.
- B. Perform work in accordance with local health department regulations.

## 2.03 EMERGENCY SHOWERS

- A. Manufacturers:
  - 1. Haws Corporation; 8300-8309: [www.hawesco.com/#sle](http://www.hawesco.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Emergency Shower: ANSI Z358.1; wall-mounted, self-cleaning, non-clogging 8 inch diameter stainless steel deluge shower head with elbow, one inch full flow valve with pull chain and 8 inch diameter ring, one inch interconnecting fittings.
- C. Thermostatic Mixing Valve: Thermostatic mixing valve, ASSE 1070 listed, with combination stop, strainer, and check valves, and flexible stainless steel connectors.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

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**3.02 PREPARATION**

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

**3.03 INSTALLATION**

- A. Install components level and plumb.
- B. Install and secure fixtures in place with wall supports and bolts.
- C. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 90 05, color to match fixture.

**3.04 ADJUSTING**

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

**3.05 CLEANING**

- A. Clean plumbing fixtures and equipment.
- B. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

**3.06 PROTECTION**

- A. Protect installed products from damage due to subsequent construction operations.
- B. Do not permit use of fixtures by construction personnel.
- C. Repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**

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**SECTION 26 05 00**  
**COMMON WORK RESULTS FOR ELECTRICAL**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to, the following:
  - 1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
  - 2. Electrical General Provisions and Requirements for electrical work.
  - 3. Division-1; General Requirements; General Conditions.
- B. Organization of the Specifications into Divisions, Sections and Articles, and arrangement of Drawings shall not control the Contractor in dividing the Contract Work among subcontractors or in establishing the extent of work to be performed by any trade.

**1.02 GENERAL SUMMARY OF ELECTRICAL WORK**

- A. The Specifications and Drawings are intended to cover a complete installation of systems. The omission of expressed reference to any item of labor or material for the proper execution of the work in accordance with present practice of the trade shall not relieve the Contractor from providing such additional labor and materials.
- B. Refer to the Drawings and Shop Drawings of other trades for additional details, which affect the proper installation of this work. Diagrams and symbols showing electrical connections are diagrammatic only. Wiring diagrams do not necessarily show the exact physical arrangement of the equipment.
- C. Before submitting a bid, the Contractor shall become familiar with all features of the Building Drawings and Site Drawings, which may affect the execution of the work. No extra payment will be allowed for failure to obtain this information.
- D. If there are omissions or conflicts between the Drawings and Specifications, clarify these points with the District's Representative before submitting bid and before commencing work.
- E. Provide work and material in conformance with the Manufacturer's published recommendations for respective equipment and systems.

**1.03 LOCATIONS OF EQUIPMENT**

- A. The Drawings indicate diagrammatically the desired locations or arrangements of conduit runs, outlets, equipment, etc., and are to be followed as closely as possible. Proper judgment must be exercised in executing the work to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structure conditions encountered.
- B. Where outlets are placed on a wall, locate symmetrically with respect to each other, furniture, cabinets, and other features or finishes on the wall.

- C. In the event changes in the indicated locations or arrangements are necessary, due to developed conditions in the building construction or rearrangement of furnishings or equipment, such changes shall be made without cost to the Contract, providing the change is ordered before the conduit runs, etc., and work directly connected to same is installed and no extra materials are required.
- D. Lighting fixtures in mechanical spaces are shown in their approximate location only. Do not install light outlets or fixtures until mechanical piping and ductwork is installed; then install lights in a location to provide best lighting.
- E. Coordinate and cooperate in every way with other trades to avoid interference and assure a satisfactory job.

#### **1.04 POOL EQUIPMENT WIRING**

Provide electrical work, materials, and control components required for proper operation of the pool equipment as indicated on the Electrical, and Pool Consultant Contract Documents and specified herein.

#### **1.05 PERMITS**

Take out and pay for all required permits, inspections, and examinations without additional cost to the District.

#### **1.06 QUALITY ASSURANCE**

- A. Work and materials shall be in full accordance with the latest Rules and Regulations as follows. The following publications shall be included in the Contract Documents Requirements. If a conflict occurs between the following publications and any other part of the Contract Documents, the Requirements describing the more restrictive provisions shall become the applicable Contract definition:
  1. California Code of Regulations Title 24.
  2. California Part 3 "California Electrical Code" CEC, Title 24 and Title 8 "Division of Industrial Safety".
  3. California Building Code – CBC.
  4. California Fire Code – CFC
  5. National Fire Protection Agency – NFPA.
  6. National Fire Alarm Code – NFAC/NFPA 72.
  7. Underwriter’s Laboratory – UL.
  8. Other applicable State and Local Government Agencies Laws and Regulations.
  9. Electrical Installation Standards National Electrical Contractors Association (NECA) and National Electrical Installation Standards (NEIS):
    - a. NECA/NEIS-1: Standard of Practices for Good Workmanship in Electrical Construction
    - b. NECA/NEIS-101: Standard for Installing Steel Conduit (Rigid, IMC, EMT) (ANSI)
    - c. NECA/NEIS-104: Recommended Practice for Installing Aluminum Building Wire and Cable (ANSI)
    - d. NECA/NEIS-105: Standard for Installing Metal Cable Tray Systems (ANSI)

- e. NECA/NEIS-111: Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) (ANSI)
  - f. NECA/NEIS-230: Recommended Practice for Installing Motors
  - g. NECA/FOA-301: Standard for Installing and Testing Fiber Optic Cables
  - h. NECA/NEIS-305: Standard for Fire Alarm System Job Practice (ANSI)
  - i. NECA/NEIS-331: Standard for Installing Building and Service Entrance Grounding
  - j. NECA/NEIS-400: Standard for Installing and Maintaining Switchboards
  - k. NECA/NEIS-402: Standard for Installing and Maintaining Motor Control Centers (ANSI)
  - l. NEIS/NECA and EGSA-404: Standard for installing Generator Sets (ANSI)
  - m. NECA/NEIS-405: Recommended Practices for installing and Commissioning Interconnected Generation Systems
  - n. NECA/NEIS-407: Recommended Practice for Installing Panelboards
  - o. NECA/NEIS-408: Standards for Installing and Maintaining Busways (ANSI)
  - p. NECA/NEIS-409: Recommended Practice for Installing and Maintaining Dry-Type Transformers
  - q. NEIS/NECA and IESNA-500: Recommended Practice for installing indoor Commercial Lighting Systems
  - r. NEIS/NECA and IESNA-501: Recommended Practice for Installing Exterior Lighting Systems
  - s. NEIS and IESNA-502: Recommended Practice for Installing Industrial Lighting Systems
  - t. NECA/BICSI-568: Standards for Installing Commercial Building Telecommunications System
  - u. NECA/MACSCB 600: Standard for Installing and Maintaining Medium-Voltage Cable (ANSI)
- B. All material and equipment shall be new and shall be delivered to the site in unbroken packages. All material and equipment shall be listed and labeled by Underwriters Laboratories or other recognized testing laboratories, where such listings are available. Comply with all Installation Requirements and restrictions pertaining to such listings.
- C. Work and material shown on the Drawings and in the Specifications is new and included in the Contract unless specifically indicated as existing or N.I.C. (not in Contract).
- D. Keep a copy of all applicable Codes and Standards available at the Job site at all times for reference while performing work under this contract. Nothing in Plans or Specifications shall be construed to permit work not conforming to the most stringent of building codes.
- E. Where a conflict or variation occurs between applicable Codes, Standards and/or the Contract Documents, the provisions of the most restrictive provision shall become the Requirement of the Contract Documents.

## 1.07 SUBMITTALS (ADDITIONAL REQUIREMENTS)

### A. General

1. Review of Contractor's submittals is for general conformance with the design concept of the Project and General Compliance with the information given in the Contract Documents. Any action shown is subject to the Requirements of the Plans and Specifications. Contractor is responsible for quantities; dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of work with that of all other trades and satisfactory performance of their work.
2. The Contractor shall review each submittal in detail for compliance with the Requirements of the Contract Documents prior to submittal. The Contractor shall "Ink Stamp" and sign each item of the submittal with a statement "CERTIFYING THE SUBMITTAL HAS BEEN REVIEWED BY THE CONTRACTOR AND COMPLIES WITH ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS". The Contractor shall clearly and specifically identify each individual proposed substitution, substitution of equal or proposed deviation from the Requirements of the Contract Documents with a statement "THIS ITEM IS A SUBSTITUTION".

The burden of research, preparation of calculations and the furnishing of adequate and complete Shop Drawings information to demonstrate the suitability of Contractor's proposed substitutions and suitability of proposed deviations from the Contract Documents is the responsibility of the Contractor.

3. Departure from the submittal procedure will result in resubmittals and delays. Failure of the Contractor to comply with the submittal Requirements shall render void any acceptance or any approval of the proposed variation. The Contractor shall then be required to provide the equipment or method without variation from the Contract Documents and without additional cost to the Contract.
4. The Contractor at no additional cost or delays to the Contract shall remove any work, material and correct any deficiencies resulting from deviations from the Requirements of the Contract Documents not approved in advance by the District prior to commencement of work.
5. Shop Drawings submitted by the Contractor, which are not specifically required for submittal by the Contract Documents, or Contractor Shop Drawings previously reviewed and resubmitted without a written resubmittal request to the Contractor, will not be reviewed, considered, or commented on. The respective Shop Drawing submittal/resubmittal will not be returned to the Contractor and will be destroyed without comment or response to the Contractor. The respective submittal shall be considered null and void as being not in compliance with the Requirements of the Contract Documents.
6. Refer to Division-1 for Additional Requirements.

### B. Material Lists and Shop Drawings

1. Submit Material list and Equipment Manufacturers for review within 35 days of award of Contract. Give name of Manufacturer and where applicable, brand name, type and/or catalog number of each item. Listing of more than one Manufacturer for any one item of equipment, or listing items "as specified", without both make and model or type designation, is not acceptable. Shop Drawings shall not be submitted before review



completion of Manufacturers list. The right is reserved to require submission of samples of any material whether or not particularly mentioned herein.

2. After completion of review of the Material and Equipment Manufacturers list, submit Shop Drawings for review. Shop Drawings shall be submitted in completed bound groups of materials (i.e., all lighting fixtures or all switchgear, etc.). The Contractor shall verify dimensions of equipment and be satisfied as to fit and that they comply with all Code Requirements relating to clear working space about electrical equipment prior to submitting Shop Drawings for review. Submittals, which are intended to be reviewed as substitution or departure from the Contract Documents, must be specifically noted as such. The Requirements of the Contract Documents shall prevail regardless of the acceptance of the submittal.
3. The time required to review and comment on the Contractor's submittals will not be less than 14 calendar days, after receipt of the submittals at the office of FBA Engineering. The review of Contractor submittals and return to Contractor of submittals with review comments will occur in a timely manner conditioned upon the Contractor complying with all the following:
  - a. The submittals contain complete and accurate information, complying with the Requirements of the Contract Documents.
  - b. Contractor's submittals are each marked with Contractor's approval "stamp", and with Contractor signatures.
  - c. The submittals are received in accordance with a written, shop drawing submittal schedule for each submittal. The Contractor distributes the schedule not less than 35-calendar days in advance of the Shop Drawing Submittals, and the schedule identifies the calendar dates, the Contractor will deliver the various submittals for review.
4. Shop Drawings shall include the Manufacturers projected days for shipment from the factory of completed equipment, after the Contractor releases the equipment for production. It shall be the responsibility of the Contractor to ensure that all material and equipment is ordered in time to provide an orderly progression of the work. The Contractor shall notify the District's Representative of any changes in delivery, which would affect the Project completion date.
5. Submittal Identification
  - a. Each submittal shall be dated: with submittal transmission date; sequentially numbered and titled with submittal contents identification and applicable Specification/Drawing references (i.e., *Submittal dated: 05/12/98 Submittal #4 Contents: Branch Circuit Panelboards Sheet #E5.1 and Transformers Specification Section 260500 Paragraph 2.11, etc.*).
  - b. Each resubmittal shall be dated: with original submittal date and resubmittal transmission dates; sequentially numbered with original submittal number and sequential resubmittal revision number and titled with submittal contents identification and applicable Specifications/Drawing references (i.e., *Original Submittal Date: 05/12/98 Resubmittal Date: 10/09/98 Original Submittal #4 Resubmittal Revision R2 Contents: Transformer Resubmittal Specification Section - 260500 Paragraph 2.11, etc.*).

- c. Contractor shall provide a written response narrative with each resubmittal. Describe each response-action, resubmittal addition, change and deletion. Correspond to each response to A/E specific review comment.
- C. The Contractor shall be responsible for incidental, direct and indirect costs resulting from the Contractor's substitution of; or changes to; the specified Contract Materials and Work.
- D. The Contractor shall pay, upon request by the District's Representative, a fee for the District's Representative time involved in the review of substitution submittals and design changes resulting from the Contractor's requested substitutions. The fee shall be not less than \$125.00 per hour but, in no case, less than stated in Division-1, whichever is greater.
- E. Maintenance and Operating Manuals
  - 1. The Contractor shall furnish three copies of type-written maintenance and operating manuals for all electrical equipment, fire alarm equipment, sound system equipment, etc., to the District.
  - 2. Instruct the District's Personnel in correct operation of all equipment at completion of Project. Provide the quantity and duration of instruction class as specified; but in no case less than two 4-hour duration separate instruction classes for each individual equipment group furnished as part of the Contract. Instruction classes shall be presented by Manufacturer's authorized field service Engineer at the project site. Instruction class size shall be at the District's discretion, not less than one or more than fifteen students shall attend each instruction session. Submit fifteen written outline copies of the proposed instruction class curriculum, 14-days prior to the class-scheduled dates.
  - 3. Maintenance and operating manuals shall be bound in three-ring, hard-cover, plastic binders with table of contents. Manuals shall be delivered to the District's Representative, with an itemized receipt.
- F. Portable or Detachable Parts: The Contractor shall retain in his possession and shall be responsible for all portable and detachable parts or portions of the installation such as fuses, keys, locks, adapters, locking clips, and inserts until final completion of Contract Work. These parts shall then be delivered to the District's Representative with an itemized receipt.
- G. Record Drawings (Additional Requirements)
  - 1. Provide and maintain in good order a complete set of Electrical Contract "Record" prints. Changes to the Contract to be clearly recorded on this set of prints. At the end of the Project, transfer all changes to one set of transparencies to be delivered unfolded to the District's Representative.
  - 2. The actual location and elevation of all buried lines, boxes, monuments, vaults, stub-outs, and other provisions for future connections shall be referenced to the building lines or other clearly established base lines and to approved benchmarks. If any necessary dimensions are omitted from the Record Drawings, the Contractor shall, at the Contractor's own expense, do all excavation required to expose the buried work and to establish the correct locations.
  - 3. The Contractor shall keep the "Record" prints up to date and current with all work performed.
  - 4. Refer to Division-1 for Additional Requirements.

## **1.08 CLEANING EQUIPMENT, MATERIALS, PREMISES**

All parts of the equipment shall be thoroughly cleaned of dirt, rust, cement, plaster, etc., and all cracks and corners scraped out clean. Surfaces to be painted shall be carefully cleaned of grease and oil spots and left smooth, clean and in proper condition to receive paint finish.

## **1.09 JOB CONDITIONS - PROTECTION**

Protect all work, materials, and equipment from damage from any cause whatever and provide adequate and proper storage facilities during the progress of the work. Provide for the safety and good condition of all the work until final acceptance of the work by the District and replace all damaged or defective work, materials, and equipment before requesting final acceptance.

## **1.10 IDENTIFICATION**

- A. Plates: All cover and device plates shall be furnished with engraved or etched designations under any one of the following conditions (minimum character size not less than 0.188 inch. Engraving shall indicate circuits and equipment controlled or connected):
1. More than two devices under a common coverplate.
  2. Lock switches.
  3. Pilot switches.
  4. Switches in locations from which the equipment or circuits controlled cannot be readily seen.
  5. Manual motor starting switches.
  6. Where so indicated on the Drawings.
  7. As required on all control circuit switches, such as heater controls, motor controls, etc.
  8. Receptacles other than standard 15-amp 120-volt duplex receptacles; shall indicate circuit voltage, ampere, phase and source circuit number.
  9. Where outlets or switches are connected to emergency power circuit; provide panel-board and circuit number engraved on plate.
  10. Low voltage and signal system outlets.
- B. Wire and Cable Identification
1. Provide identification on individual wire and cable including signal systems, fire alarm, electrical power systems (each individual phase, neutral and ground), empty conduit pull ropes, and controls circuit.
  2. Permanent identification shall be provided at each termination location, splice location, pullbox, junction box and equipment enclosure.
    - a. Individual wire and cable larger than #6AWG or 0.25-inch diameter, shall be provided with polypropylene identification tag holders, with yellow polypropylene tags interchangeable black alphanumeric characters, character height 0.25 inch. Attach identification tags with plastic "tie" wraps, minimum of two for each tag. As manufactured by Almetek Industries- "EZTAG" series; or TECH Products - "EVERLAST" series.
    - b. Individual wire and cable #6AWG and smaller or smaller than 0.25-inch diameter, shall be provided with water and oil resistant, flexible, self-laminating pressure

sensitive machine embossed plastic tags that wrap a minimum of 360 degrees around the wire/cable diameter. The entire tag shall then be covered with a clear flexible waterproof plastic cover wrapped a minimum of 540 degrees around the wire/cable diameter and completely covering the identification. As manufactured by Brady Identification; or 3M; or Panduit.

- c. Each identification tag location shall indicate the following information: circuit number, circuit phase, source termination and destination termination equipment name (or outlet number as applicable).
- 3. Install permanent identification after installation/pulling of wire/cable is complete, to prevent loss or damage to the identification.
- C. Cardholders and cards shall be provided for circuit identification in panelboards. Cardholders shall consist of a metal frame retaining a clear plastic cover permanently attached to the inside of panel door. List of circuits shall be typewritten on card. Circuit description shall include name or number of circuits, area, and connected load.
- D. Junction and pullboxes shall have covers stenciled with box number when shown on the Drawings, or circuit numbers according to panel schedule. Data shall be lettered in a conspicuous manner with a color contrasting to finish.

#### **1.11 POWER OUTAGES**

- A. All Electrical Services in all occupied facilities of the Contract Work are to remain operational during the entire Contract period. Any interruption of the electrical services for the performance of this work shall be at the convenience of the District and performed only after consultation with the District's Representative. Work involving circuit outages shall be only at such a time and of such a duration as approved in writing. Work involving circuit outages for the work required to connect new equipment and disconnect existing equipment shall be performed at the convenience of the District.
- B. Contract Work involving outages or disruption of normal function in electrical power systems, telephone/communication systems, fire alarms, shall be performed during the following time periods. The contract work shall be phased to limit outages in the respective systems to the stated periods:
  - 1. 11:30 p.m. Friday to 11:30 p.m. Sunday of the same weekend. Work shall occur on multiple weekend periods if a single weekend is not sufficient time to complete the work.
  - 2. The contract work involving outages shall be phased in multiple work time units, to comply with the permitted outage limitations.
- C. Work involving system outages to the building fire alarm system shall be performed only after consultation with the District and shall be only at such a time and of such duration as approved in writing. Contractor shall provide continuous "Fire-Watch" during fire alarm system outages and comply with AHJ "Fire-Watch" Requirements.
- D. Provide overtime work; double shift work; nighttime work; Saturday, Sunday, and holiday work to meet outages schedule.
- E. Provide temporary electrical power to meet the Requirements of this Article.
- F. Any added costs to Contractor due to necessity of complying with this Article shall be included in the Contract Scope of Work.

- G. When electrical work involving power disruptions to existing areas is initiated, the work shall proceed on a continuous basis without stopping until electric power is restored to the affected areas.
- H. The Contractor shall request in writing to the District's Representative a minimum of 3-weeks in advance, for any proposed electrical outage.

**1.12 TEMPORARY ELECTRICAL POWER**

- A. Provide temporary electrical power if work requiring power outages cannot be completed in time permitted and approved by the District's Representative.
- B. Temporary electrical power shall be a standby diesel engine generator. Voltage, frequency, regulation, etc. shall be equal to that of normal utility source. Exhaust system shall have a critical silencing muffler. Generator voltage shall match the existing secondary voltage required at the site. The Contractor shall furnish all necessary cables, switches, etc., to make all required connections to existing panels, feeders, etc. Generator shall be sized to adequately carry the demand load. If record of demand load is not available, size generator to match corresponding transformer, maximum capacity circuit as directed by the District's Representative.
- C. After completion of required usage of the temporary generators, prior to completion of the Project, the Contractor shall remove the generators. All temporary cables, switches, etc. shall be removed and all permanent equipment left in satisfactory condition.
- D. Each generator shall be housed in security type sound attenuated housing to prevent access by unauthorized Personnel. Temporary power cables, connections, etc. shall be protected from unauthorized Personnel.
- E. The Contractor shall be responsible for complete operation of the generator including Personnel, fuel supplies, proper safety precautions, etc. Generator shall not be left unattended while in operation.
- F. The Contractor shall provide temporary construction lighting and power as required in areas where work is being performed. Temporary power arrangements, outages, installation, work schedules, etc., shall be submitted in writing 3-weeks prior to requested outage date, and approved by the District's Representative prior to start of work.

**1.13 ASBESTOS, POLYCHLORINATED BIPHENYL (PCB) OR HAZARDOUS WASTE:**

- A. It is understood and agreed that this contract does not contemplate the handling of asbestos, PCB, or any hazardous waste material. If asbestos, PCB, or any hazardous waste material is encountered, notify the District's Representative immediately. Do not disturb, handle, or attempt to remove.
- B. Lighting Fixture Demolition Hazardous Materials
  - 1. The removal of existing lighting fixtures will generate hazardous material Waste Disposal Contract Documents.
    - a. The existing lighting fixture ballast contains PCB material.
    - b. The existing lighting fixture lamps contain mercury.
    - c. The existing lighting fixture internal wire insulation may contain asbestos.
  - 2. Remove, handle, store, contain, dispose-of and document the hazardous materials resulting from existing lighting fixtures work, as part of the Contract Requirements.

#### **1.14 INDEPENDENT TESTING LABORATORY**

##### **A. Testing Laboratories Definition**

1. The Testing Laboratory shall meet Federal OSHA Criteria for accreditation of Nationally Recognized Testing Laboratories (NRTL) Title 29 Part 1907 and 29 CFR-1910.
2. Membership in the National Electrical Testing Association (NETA) shall also constitute acceptance of meeting said criteria, for testing of electrical systems.

#### **1.15 ELECTRICAL WORK CLOSEOUT**

##### **A. Prepare the following items and submit to the District's Representative before final acceptance.**

1. Two copies of all test results as required under this Section.
2. Two copies of Local and/or State Code enforcing authorities' final inspection certificates.
3. Copies of record Drawings as required under the General Conditions, pertinent Division One Sections and Electrical General Provisions.
4. Two copies of all receipts transferring portable or detachable parts to the District's Representative when requested.
5. Notify the District's Representative in writing when installation is complete and that a final inspection of this work can be performed. In the event any defect or deficiencies are found during this final inspection they shall be corrected to the satisfaction of the District's Representative before final acceptance can be issued.

END OF SECTION 26 05 00  
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**SECTION 26 05 01**  
**BASIC ELECTRICAL MATERIALS AND METHODS**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
  - 1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
  - 2. General Provisions and Requirements for electrical work.

**1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)**

- A. Submit product data sheets for all outlet boxes, wiring devices, device plates, relays, contactors, timeswitches, and disconnects fuses.
- B. Submit detailed Shop Drawings including Dimensioned Plans, elevations, details, schematic and point-to-point wiring diagrams and descriptive literature for all component parts for relays, time clocks, and photocells.
- C. Submit material list for outlet boxes.

**PART 2 - PRODUCTS**

**2.01 OUTLET AND JUNCTION BOXES**

- A. General:
  - 1. Flush or concealed outlet boxes and junction boxes.
    - a. Non-masonry and/or non-concrete locations provide pressed steel boxes. Steel thickness not less than 0.062-inch, hot-dip galvanized. Knockout (KO) type with conduit entrances and quantity size to match conduits shown connecting to respective junction box and outlet box.
    - b. UL-514 listed and labeled.
    - c. Minimum required box depth is exclusive of extension-ring depth.
    - d. Provide all boxes with matching cover plates. Cover plates shall be gasketed water-tight in wet and outdoor locations.
    - e. Boxes installed in masonry or concrete shall be UL "concrete-tight" approved for installation in concrete and shall allow the placing of conduit without displacing reinforcing bars.
  - 2. Provide boxes of proper code size for the number of wires or conduits passing through or terminating therein. In no case shall box be less than 4.0-inches square by 2.125-inches deep, unless specified elsewhere or noted otherwise on the Drawings. 2.5-inches minimum depth for box width's exceeding 2-gang.

3. Increase the minimum outlet box size to 4.69-inches square by not less than 2.125-inches deep, where one or more of the following conditions occurs:
  - a. More than two conduits connect to the outlet box.
  - b. Circuit or Conduit "homerun" connects to outlet box.
4. Signal, Communication and Low Voltage:
  - a. Individual audio/visual, telephone, computer, or data outlets: 4.69-inches square by 2.125-inch-deep minimum with two gang extension rings on flush boxes.
  - b. Combination signal/telephone/data or computer outlets: 4.69-inches square by 2.125-inch-deep minimum with 2-gang wide extension ring on flush boxes.
5. Junction boxes shall be sized to comply with the following:
  - a. Code Requirements size based on the conduit quantities, conduit sizes and wire-fill connected to the junction box.
  - b. Junction box minimum size shall not be less than 4.69-inches by 4.69-inches by 2.5-inches deep, but not less than size indicated on the Drawings or required by code.
6. Provide extension rings on flush outlets to finish face of extension ring flush with finished building surfaces. Extension ring shall match outlet box construction and contain "attachment mounting-tabs" for wiring devices. Extension rings shall be "screw-attached" to respective outlet box and maintain "ground" bonding continuity.
7. Outlet boxes installed in outdoor locations, or in wet locations, or in concrete/masonry, shall be cast-iron or cast bronze, with threaded conduit hubs. UL rated for wet locations.
  - a. Aluminum boxes shall NOT be in contact with concrete or masonry. Die-cast aluminum or cast aluminum water-tight electrical outlet boxes with threaded hubs may be provided as an alternate to cast-iron or cast-bronze outlet boxes, only where one or more of the following conditions occur:
    - 1) Outdoor locations above finish grade.
    - 2) Indoor wet locations surface or flush in walls or ceilings.
8. Provide fixture-supporting device in outlet boxes for surface mounted fixtures as required.
9. Provide solid gang boxes for three or more devices, typical for line and low voltage switches, receptacles, low voltage/signal outlets, etc. for mounting devices behind a common device plate.
10. Provide isolation barriers in outlet boxes:
  - a. Between line voltage and low voltage devices.
  - b. Where more than one device is installed in an outlet box.
  - c. Between 277-volt and 120-volt devices.
  - d. Between devices connected to emergency and non-emergency circuits of all volt-ages.
11. Outlet boxes installed penetrating into fire rated walls, fire rated floors, fire rated ceilings and all fire rated construction. The outlet boxes shall be UL listed, classified, and labeled, for fire rated and temperature rated penetration of the respective fire rated surface and fire rated construction. The outlet box fire rating and temperature rating shall equal or exceed the fire/temperature rating of the surface/construction being penetrated.



Provide UL listed and labeled supplemental fire and temperature protection to maintain ratings:

- a. Wall and ceiling penetrations, tumescent fire wrap (external or internal of outlet box).
  - b. Floors provide subfloor supplemental fireproofing below floor box.
12. Outdoor flush in wall device outlet boxes:
- a. Flush in wall, gasketed watertight, with hinged, key locking cast metal, self-closing cover. Tamper resistant and vandal resistant. UL-listed and labeled for installation in masonry, cast-in-place concrete, and hollow-framed walls.
  - b. Flush cast-iron or cast-bronze device back-box, 4.68-inch square by 2.25-inch deep.
  - c. Internal metal adapter plate and wiring device types, in the box as indicated on the Drawings.
  - d. As manufactured by Legrand/Pass and Seymour #4600 Series: or C.W. Cole #310 Series.
13. Refer to Architectural and Structural Contract Documents and details for additional Box and Install Requirements.
- B. Surface Outlet Boxes
1. Surface mounted outlet boxes, cast iron Type FS or FD, with threaded hubs as required. Box interior dimensions and interior volume capacity not less than required for “press steel boxes”, and “sheet steel boxes”. Provide plugs in all unused openings. Provide weatherproof gaskets for all exterior boxes.

## **2.02 PULLBOXES**

### **A. General**

1. Sizes as indicated on the Drawings and in no case of less size or material thickness than required by the Governing Code and AHJ.
2. Exercise care in locating pull boxes to avoid installation in drain water flow areas and to clear existing condition interferences.
3. UL listed and labeled for electrical circuits.

### **B. General Purpose Sheet Metal Pullbox**

1. General purpose sheet steel pull boxes: Install only in dry protected locations with removable screw covers. Manufacturer's standard rust proofing and baked enamel finishes.
2. Weatherproof sheet steel pull boxes: Fabricate of code gauge steel. All surfaces interior and exterior hot-dip galvanized steel. Gasketed weather-tight cover of same material. Manufacturer's standard baked exterior enamel finish.

## **2.03 SWITCHES**

### **A. General**

1. Provide wiring device circuit switches totally enclosed, electrical insulating Bakelite or electrical insulating composition base, manual operator type with 277-volt 60Hz AC rating for full capacity contacts rated for incandescent lamp loads, fluorescent lamp loads

and motor loads. Switch mounting ears for screw attachment to outlet box. Switches shall be UL listed and labeled; conform to NEMA-WD1 and WD6.

2. Switch controlling (on-off) rated for all lighting loads and all non-lighting loads; switch ratings shall be 20-amp, unless indicated otherwise on Drawings.
3. Color as selected by District’s Representative. Switches controlling circuits connected to emergency power shall be red.
4. All switches shall be of the same Manufacturer.
5. Where switches are mounted in multiple gang assembly and are operating at 277-volt and/or 277-volt and 120-volt or emergency/non-emergency and mounted in same outlet box, there shall be an insulating barrier installed between each switch.
6. Devices shall additionally be listed and labeled as UL-All Weather-Resistant for the following install locations:
  - a. Devices indicated on Drawings as Weather-Proof (W.P.).
  - b. Devices installed in outdoor locations
  - c. Installed in classified wet or damp area locations both indoor and outdoor.
7. Wiring devices shall be listed and labeled for connection of both “solid” and “stranded” copper circuit conductors.
8. Switches with ampere and voltage ratings different than described herein. The different rated switches shall have the same characteristics and performance as the respective described switches, except for differing ampere and voltage characteristics.

B. Switches Heavy Duty (Toggle – Type)

1. Single Pole Switches – 20 amp at 277V

<u>Manufacturer</u>	<u>Toggle Type</u>	<u>Lock Type</u>
Hubbell	#HBL1221	#HBL1221-L
Legrand/P&S	#20AC1	#20AC1-L
Leviton	#1221	#1221-L
Cooper-Arrow/Hart	#AH1221	#AH1221-L

2. Double Pole Switch – 20 amp at 277V

<u>Manufacturer</u>	<u>Toggle Type</u>	<u>Lock Type</u>
Hubbell	#HBL1222	#HBL1222-L
Legrand/P&S	#20AC2	#20AC2-L
Leviton	#1222	#1222-L
Cooper-Arrow/Hart	#AH1222	#AH1222-L

3. Three-Way Switches – 20 amp at 277V

<u>Manufacturer</u>	<u>Toggle Type</u>	<u>Lock Type</u>
Hubbell	#HBL1223	#HBL1223
Legrand/P&S	#20AC3	#20AC3-L
Leviton	#1223	#1223-L
Cooper-Arrow/Hart	#AH1223	#AH1223-L

4. Four-Way Switches – 20 amp at 277V

<u>Manufacturer</u>	<u>Toggle Type</u>	<u>Lock Type</u>
Hubbell	#HBL1224	#HBL1224-L
Legrand/P&S	#20AC4	#20AC4-L

- |                   |         |           |
|-------------------|---------|-----------|
| Leviton           | #1224   | #1224-L   |
| Cooper-Arrow/Hart | #AH1224 | #AH1224-L |
5. Momentary Contact Switches – 20 amp at 277V

<u>Manufacturer</u>	<u>3-Position Regular</u>	<u>3-Position Lock</u>
Hubbell	#HBL1557	#HBL1557-L
Legrand/P&S	#1251	#1251-L
Leviton	#1251	#1251-L
Cooper-Arrow/Hart	#AH (extra)	#AH (extra)
  
  6. Maintained Contact Switches (Double Throw, Center Off) – 20 amp at 277V

	<u>Toggle Type</u>		<u>Lock Type</u>	
<u>Manufacturer</u>	<u>1-Pole</u>	<u>2-Pole</u>	<u>1-Pole</u>	<u>2-Pole</u>
Legrand/P&S	#1225	#1226	#12250L	#1226-L
Hubbell	#HBL1385	#HBL1386-L	#HBL1385-L	#HBLM1386-L
Leviton	#1385	#1386		
Cooper-Arrow/Hart	#AH (extra)	#AH (extra)	#AH (extra)	#AH (extra)
  
  7. Pilot lights used in conjunction with circuit switches shall be LED type with red jewel.

## 2.04 RECEPTACLES

### A. General

1. All receptacle wiring devices in flush type outlet boxes shall be installed with a bonding jumper to connect the box to the receptacle ground terminal. Grounding through the receptacle mounting straps is not acceptable. The bonding jumper shall be sized in accordance with the branch circuit protective device as tabulated herein under "Grounding". Bonding jumper shall be attached at each outlet to the back of the box using drilled and tapped holes and washer head screws 6-32 or larger (except isolated ground receptacles). For receptacles in surface mounted outlet boxes direct metal-to-metal contact between receptacle mounting strap (if it is connected to the grounding contacts) and outlet box may be used. Receptacle mounting ears for screw attachment to outlet box. Receptacle shall be UL listed and labeled; conform to NEMA-WD1 and WD6.
2. All receptacles shall be same Manufacturer.
3. Receptacle color as selected by District’s Representative. Receptacles connected to emergency power circuits shall be red.
4. Tamper Resistant Receptacle
  - a. Devices shall additionally be listed and labeled as tamper resistant.
  - b. The electrical receptacles shall be rated “Tamper-Resistant-Receptacle” (TR), UL-TR (RTRT). Spring loaded shutters shall automatically open-close (unblock-block) the receptacle slots when the plug-in (cap) insertion and removal occurs.
  - c. Typical for 15-amp and 20-amp receptacles. Modify Manufacturer’s catalog number description to include tamper resistant receptacle function.
5. Wiring devices shall be listed and labeled for connection of both “solid” and “stranded” copper circuit conductors.

6. Duplex convenience receptacles and 120-volt single phase branch circuits.
    - a. Duplex (convenience) receptacle, wiring device with two single receptacles with the same electrical rating, integrated into a single assembly by the Manufacturer.
    - b. 20-amp branch circuits with a single duplex convenience receptacle connection on each circuit, receptacles shall be rated for 20-amp.
    - c. 15-amp and 20-amp branch circuits with two or more duplex convenience receptacle connections each circuit, receptacle shall be rated 15-amp or 20-amp.
  7. Devices shall additionally be listed and labeled as UL-All Weather-Resistant, provide weather resistant receptacles for the following install locations:
    - a. Devices indicated on Drawings as Weather-Proof (W.P.).
    - b. Devices installed in outdoor locations.
    - c. Devices installed in classified as damp or wet locations both indoor and outdoor.
    - d. All GFCI (ground-fault) receptacles all locations.
  8. Receptacles with ampere and voltage ratings different than described for duplex convenience receptacles. The different rated receptacles shall have the same characteristics and performance as the respective duplex convenience receptacles, except for differing ampere and voltage characteristics.
  9. Receptacles shall be GFCI type for the following locations:
    - a. located within 84-inches of a sink or hosebib shall be GFCI receptacles.
    - b. Devices installed in outdoor locations.
    - c. Devices installed in classified as damp or wet locations both indoor and outdoor.
    - d. Devices indicated on Drawings as GFCI or Weather-Proof (W.P.).
- B. Duplex convenience receptacles.
1. Shall be grounding type, 120 volt and shall have two current carrying contacts and one grounding contact which is internally connected to the frame. Outlet shall accommodate standard parallel blade cap and shall be side wired. Receptacles shall be tamper-resistant –TR, UL-TR.
  2. GFCI receptacles shall be all Weather-Resistant and wet location rated. Rated 120-volt 60Hz AC, 20-amp, unless indicated otherwise on Drawings.
  3. Heavy Duty Industrial Grade
 

<u>Manufacturer</u>	<u>NEMA 5-15R</u>	<u>NEMA 5-20R</u>	<u>NEMA 5-20R-GFCI</u>
a. Legrand/P&S	#5262	#5362	#2095HG
b. Leviton	#5262	#5362	#W7899
c. Hubbell	#CR5252	#5362	#GFR8300
d. Cooper-Arrow/Hart	#AH5262	#AH5362	#WRVGF20
- C. Weatherproof (W.P.) Receptacle
1. Outdoor receptacles shall be duplex convenience GFCI type rated 20-amp 120 Volt 60Hz AC weatherproof, GFCI, unless indicated otherwise on Drawings. Test-reset buttons and visual pilot.

2. GFCI receptacles shall be wet location and Weather-Resistant rated weatherproof, gasketed, key locking tamper resistant, wet location.
  3. Outdoor, flush mount outlet with hinged, key-locking, weather-proof cover (CEC – 406.8 compliant). As manufactured by Pass and Seymour/Legrand #4600 Series; or C.W. Cole #310 Series.
  4. On exposed conduit runs, provide weatherproof ground fault circuit interrupter type GFCI receptacles installed in "FS" conduit watertight cast metal body, with weather-proof spring door type covers, gasket watertight. Door shall be key locking-type or pad-lock-type.
- D. Other switches, receptacles, devices, and outlets.
1. Special devices, outlets and outlet locations shall be as indicated on the Drawings. Modify device and outlet characteristics to accommodate the actual install location conditions for each outlet.

## **2.05 PLATES**

- A. Metal cover plates for devices
1. Provide cover plates for every switch, receptacle, telephone, computer, television, and other device outlets. All plates shall be 0.040-inch stainless steel, Type 302 alloy composed of 18% chromium and 8% nickel. Plates shall be manufactured by P&S, Hubbell, Leviton, or General Electric.
- B. Residential location project non-metal cover plates for devices.
1. Provide plates for every switch, receptacle, telephone, computer, television, and other device outlets. Non-metallic, heavy-duty, high-abuse and high-impact resistant plates. Plates shall be same Manufacturer as the respective wiring device.

## **2.06 VANDAL-PROOF FASTENINGS**

Provide approved vandal proof type screws, bolts, nuts where exposed to sight throughout the project. Screws for such items as switch plates, receptacle plates, fixtures, communications equipment, fire alarm, blank covers, wall, and ceiling plates to be spanner head stainless steel, tamperproof type. Provide District with six screwdrivers for this type.

## **PART 3 - EXECUTION**

### **3.01 GROUNDING (ADDITIONAL REQUIREMENTS)**

- A. Grounding shall be executed in accordance with all applicable Codes and Regulations, both of the State of California and local authorities having jurisdiction.
- B. The neutral of each transformer shall be grounded by individual separate ground conductors in individual conduits as follows:
1. Conductor and conduit shall be grounded to building main ground bus.
  2. Conductor and conduit shall be grounded to nearest available effectively grounded building structural steel member or grounded metal cold water pipe.

- C. The transformer neutral ground conductors for secondary side of the transformers shall be copper and shall be sized according to the following table:
- | <u>Secondary Total Equivalent<br/>Size Copper</u> | <u>Neutral Ground Wire<br/>Size Copper</u> |
|---|--|
| #2 or smaller                                     | #6-1-inch conduit                          |
| 1 or 1/0  | #4-1-inch conduit                          |
| 2/0 or 3/0  | #2-1¼-inch conduit                         |
| 4/0 thru 350 MCM                                  | #1-1¼-inch conduit                         |
| Over 350 MCM thru 600 MCM                         | 2/0-1½-inch conduit                        |
| Over 600 MCM thru 1100 MCM                        | 3/0-1½-inch conduit                        |
| Over 1100 MCM                                     | 4/0-2-inch conduit                         |
- D. Each pullbox or any other enclosure in which several ground wires are terminated shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.
- E. The maximum resistance to ground shall not exceed 5 ohms.

### 3.02 OUTLET AND JUNCTION BOXES

- A. General:
1. Accurately place boxes and securely fastens to structural members. Where outlets are shown at same location but at different mounting heights, install outlets in one vertical line. Where outlets are shown at same location and mounting height, mount outlets as close together in a horizontal row as possible. Where the outlet boxes for switches and receptacles are shown at the same location and mounting height, mount in common outlet box with barriers between devices. Provide single piece multi-gang cover plate for close mounted outlet boxes. Where switches are shown on wall adjacent to hinge side of doors, box shall be installed to clear door when door is fully opened.
  2. Flush mounted boxes shall be attached to not less than two parallel studs or structure members by means of metal supports. The supports shall span between and attach to the structure members.
  3. Boxes above accessible ceilings shall be attached to structural members. Where boxes are suspended, they shall be supported independently of conduit system by means of hanger rods and/or preformed steel channels. Boxes shall be supported independently of all piping, ductwork, equipment, ceiling hanger wires and suspended ceiling grid system.
  4. Surface mounted outlets shall be attached to concrete or masonry walls by means of expansion shields.
  5. Outlet Box Horizontal and Vertical Separation: Outlet boxes and device outlet rings installed flush in walls shall be horizontally and vertically separated by not less than 24-inches (edge of box to edge of box) from device outlet boxes and rings in common wall surfaces located on the opposite (back) side of the same wall.
    - a. Where the separation cannot be maintained, provide a solid backing behind and completely enclosing each outlet box.
    - b. The backing shall extend the width of the wall cavity (i.e., between "studs" or masonry cells) behind the box and 12-inches above and below the outlet box centerline, completely enclosing the outlet box.

- c. The backing shall consist of the following:
  - 1) 5/8-inch thick gypsum board anchored in place for "stud" wall construction.
  - 2) Solid "mortar" to completely fill the outlet box "cell" behind the box in masonry construction.
- 6. Provide metal outlet box for each device. Install devices in metal outlet boxes. Typical for all wiring devices including, switches, receptacles, line voltage devices, and low voltage/signal system devices.
- B. Fire Wrap:
  - 1. In fire rated walls and ceilings provide fire rated "box-wrap" around the outside of each outlet box placed in fire rated wall or ceiling. Install the fire wrap on exterior of box inside the wall or ceiling, to maintain the fire rating of wall or ceiling with the installed outlet boxes.

### 3.03 SWITCHES AND RECEPTACLES-DEVICES

- A. General
  - 1. Provide outlet boxes for all devices, switches, receptacles, both line-voltage and low-voltage.
  - 2. Devices installed in wireways shall be installed flush in wireway assembly.
  - 3. Install and screw attach devices into outlet boxes and wireways.
  - 4. Provide ground circuit connections to all devices.
  - 5. Provide branch circuit connections to all devices.
  - 6. Provide testing and commissioning for proper operation and phase/ground connectors.
    - a. Test each GFCI devices after installation and circuit connection is complete.
    - b. Test all devices for correct polarity and proper electrical energization.
  - 7. Install and adjust all coverplates to be flush and level, with correct device identification.
  - 8. Were one or more device occurring at the proximity with other similar devices, all of the devices shall be "granged" under one common coverplate as follows:
    - a. Duplex convenience receptacles with other proximity (within 18-inches) duplex convenience receptacles.
    - b. Lighting control switches not exceeding 20-amp switch rating with other proximity (within 18-inches) similar switches.
- B. Line-voltage Plug-In Type Receptacle Installation Orientation:
  - 1. The "ground-pin" shall face "up" at the receptacle top location (double duplex) 4-plex, individual and vertically mounted individual duplex receptacles.
  - 2. The "neutral-blade" shall face "up" at the receptacle top location on horizontally mounted duplex receptacles.

### 3.04 WIREWAY INSTALLATION

Wireway hangers shall provide clamp type, hanger rod type, direct bolted bracket type from ceiling or walls as indicated on the Drawings and required for field installation locations. Supports shall be installed a minimum of 5-feet on center.

END OF SECTION 26 05 01  
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**SECTION 26 05 05**  
**ELECTRICAL DEMOLITION**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with demolition, furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to, the following:
  - 1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
  - 2. General Provisions and Requirements for electrical work.

**1.02 GENERAL SUMMARY OF DEMOLITION WORK**

- A. The Specifications and Drawings are intended to cover a complete installation. The omission of expressed reference to any item of labor or material for the proper execution of the work in accordance with present practice of the trade shall not relieve the Contractor from providing such additional labor and materials.
- B. Refer to the Drawings and Shop Drawings of other trades for additional demolition Requirements which affect the proper installation of this work. Diagrams and symbols showing electrical connections are diagrammatic only. Wiring diagrams do not necessarily show the exact physical arrangement of the equipment.
- C. It is the Contractor's responsibility to visit the site and become thoroughly familiar with all features of the building and site which may affect the proper performance of this work.
- D. Portions of these Plans have been derived from information taken from original Electrical Plans. The intent of the Drawing and Specifications is to provide a complete and operable system.

**1.03 LOCATIONS OF EQUIPMENT**

- A. The Drawings indicate diagrammatically the locations or arrangements of conduit runs, outlets, equipment, etc. Proper judgment must be exercised in executing the work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structure conditions encountered.
- B. In the event changes in the locations or arrangements are necessary, due to existing conditions in the building construction or arrangement of furnishings or equipment, such changes shall be made without cost, providing the change is ordered before the work directly connected to same is installed and no extra materials are required.

**1.04 SUBMITTALS**

- A. Schedule: Submit proposed outage schedule.
- B. Provide a sequence of demolition to ensure uninterrupted use of occupied facilities, which are to remain in operation during the Contract period.

### **1.05 CUTTING AND PATCHING**

Perform cutting and patching of the construction work which may be required for the proper demolition of the electrical work. Patching shall be of the same material, thickness, workmanship and finish as existing and accurately match surrounding work to the satisfaction of the Architect. Cutting of Structural members shall not be done without notifying the Architect and obtaining structural approval.

### **1.06 ASBESTOS, POLYCHLORINATED BIPHENYL (PCB) OR HAZARDOUS WASTE:**

It is understood and agreed that this Contract does not contemplate the handling of asbestos, PCB or any hazardous waste material. If asbestos, PCB or any hazardous waste material is encountered, notify the Owner immediately. Do not disturb, handle, or attempt to remove.

## **PART 2 - PRODUCTS**

NOT APPLICABLE

## **PART 3 - EXECUTION**

### **3.01 THE SCOPE OF THE DEMOLITION WORK SHALL INCLUDE ALL LABOR, MATERIALS, SERVICES, AND EQUIPMENT REQUIRED TO PROVIDE THE SPECIFIED NEW WORK. THIS WORK INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:**

- A. Exercise extreme caution in excavating and trenching on this site to avoid existing ducts, piping, conduits, and utilities.
- B. Refer to Architectural Drawings for wall removal locations. Except as noted otherwise, disconnect, and remove all existing wall mounted receptacles, data outlets, telephone outlets, fire alarm devices, security devices, wiring, raceways, outlet boxes and all other electrical devices and hardware attached to the walls.
- C. All conduits rising from below grade to areas where partitions, walls, and/or other construction entities are indicated as being removed shall be cut to below finish floor, capped, and abandoned. Provide patching as required.
- D. Where new partitions or other construction will cover existing outlets or fixtures making them inaccessible, move these outlets and conduits as required, or make other provisions so that the outlets will remain accessible and operational.
- E. Relocate existing wiring, cabling, conduits, and outlets from areas where plenums or roof openings are being provided.
- F. Where existing walls and ceilings are to remain, provide blank covers or plates for outlets where fixtures or devices are removed under this Contract. Prime blank plates and paint to match surrounding area.
- G. All existing panelboards, signal terminal cabinets, equipment racks, cabinets, disconnect switches; pullboxes, etc. shall remain unless noted otherwise on Plans.
- H. All existing signal system conduits, surface raceways wiring and cabling for telephone, data network, public address speakers, audiovisual systems, projectors, clocks, and fire alarm devices, intrusion detection device, television outlets to remain unless noted otherwise on Plans.

- I. Seal all abandoned floor penetrations in manner acceptable to the Architect.
- J. Repair and/or replace roofing materials, ceiling tiles, fixtures, etc. damaged by this construction.
- K. Openings in existing fire rated partitions barriers, floors, ceiling etc. shall be sealed tight with UL and NEPA fire stop material equal to fire rating of the penetrated surface.
- L. Install all new conduits concealed in walls or furred ceilings.
- M. Remove all exposed conduit, wire, outlets, disconnect switches and electrical mounting hardware for equipment removed.
- N. For clarity, miscellaneous equipment, and raceways not related to Project are not shown.
- O. All dimensions and locations of equipment are approximate. Contractor shall field verify all dimensions.
- P. Immediately notify the On-Site Inspector and Owner of any damage to new or existing work.
- Q. Repair/replace all damaged or defective work, materials, and equipment to the Architects satisfaction.
- U. All removed materials and equipment, which in the opinion of Architect are salvageable, shall remain the property of the Owner. Deliver such salvaged materials and equipment on premises as directed, neatly pile or store them and Protect from damage. Where materials and equipment have been removed and not replaced the exposed surface shall be painted to match surrounding surfaces. Do not reuse materials and equipment, unless specifically indicated on Plans or specified. Remove from premises and dispose of all materials considered by Architect to be scrap.

END OF SECTION 26 05 05  
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**SECTION 26 05 30**  
**CONDUIT AND WIRE**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
  2. General Provisions and Requirements for electrical work.

**1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)**

- A. Submit product data sheets for all wire, supports, conduit, fittings, and splicing materials.
- B. Submit material list for all conduit and conduit fittings.
- C. Submit details and structural engineering calculations for conduit support systems.

**PART 2 - PRODUCTS**

**2.01 CONDUIT**

- A. General
1. The interior surfaces of conduits and fittings shall be continuous and smooth, with a constant interior diameter. Conduits and conduit fittings shall provide conductor raceways of fully enclosed circular cross section. The interior surfaces of conduits and fittings shall be without ridges, burrs irregularities or obstructions. Conduits and fittings of the same type shall be of the same uniform weight and thickness.
  2. Type of conduit, type of conduit fittings and conduit supports shall be suitable for the conditions of use and the conditions of location of installation, based on the Manufacturer's recommendations and based on applicable Codes.
  3. All fittings for metal conduit shall be suitable for use as a grounding means, pursuant to the applicable Code Requirements. All metal conduit and metal conduit fittings shall provide 3 second duration ground fault current carrying ratings, when installed and connected to the respective conduit, as follows:
    - a. EMT conduit fittings.
      - 1) 0.5 inch through 1.5-inch conduit/fitting size - 10,000-amp RMS.
      - 2) 2.0 inch and larger conduit/fitting size - 20,000-amp RMS.
    - b. FMC and LTFMC Conduit Fittings
      - 1) 0.5 inch through 1.25-inch conduit/fitting size 1,000-amp RMS (without external bonding jumper).

- 2) 1.5 inch through 4.0-inch fitting size 10,000-amp RMS with bonding jumper.
4. Protective corrosion resistant finish for metal conduit fabricated from steel and metal conduit fittings fabricated from steel, shall be as follows:
  - a. Clean all metal surfaces (including metal threads) with acid bath “pickle” prior to coating, to remove dirt, oil and prepare surfaces for galvanizing.
  - b. Hot-dip galvanized zinc coating on all interior and exterior steel surfaces. Minimum finish zinc coating thickness shall not be less than 0.002 inches.
  - c. Threads shall be hot-dip zinc coated after machine fabrication.
  - d. Exterior metal surfaces shall be finished with clear organic polymer topcoat layer, after galvanizing.
  - e. The inner metal surfaces of conduit fittings shall be finished with a lubricating topcoat after galvanizing, to facilitate conductor pulling through the conduit/fitting.
5. Threads for metal conduit and metal conduit fittings shall be taper-pipe-thread, National Pipe Standards (NPS) and shall comply with ANSI-B1.20.1.
6. Metal conduit termination connector fittings shall be provided with a Manufacturer installed, insulating throat bushing inside the fitting. The bushing shall protect the wire conductor insulation from cutting, nicks and abrasion during conductor installation and electrical load “cycling” after installation is complete. The bushing shall comply with UL 94V-0 flammability.
7. Provide conduit bonding/grounding jumper from metal enclosures with “concentric ring” knockouts, to positively ground/bond each respective conduit(s) to the metal enclosure.
8. Metal conduit fittings connecting to PVC coated metal conduit shall be PVC coated to match the conduit.
9. The conduit and fittings shall be watertight and airtight without cracks and pinholes.
- B. Electrical Metallic Tubing (EMT)
  1. Rigid metal round tubing, “thin wall” steel construction, with non-threaded ends.
    - a. The conduit and conduit fittings shall comply with the Requirements for an equipment grounding conductor pursuant to applicable Codes.
    - b. The conduit shall be watertight and airtight without cracks and pinholes.
  2. EMT shall be allowed for conduit size ranges from 0.5-inch through 4.0-inches.
  3. Comply with ANSI C80.3, C80.4, and ANSI C33.98 (latest revisions); UL 594 and UL 797 (latest revisions); CEC Section 12500 (latest revision).
  4. EMT fittings:
    - a. Connectors and couplings for terminating, connecting, and coupling to EMT conduit shall be non-threaded steel fabrication.
    - b. EMT termination connector fittings shall be as follows:
      - 1) Set screw type “concrete tight” when installed in dry interior locations.
      - 2) Compression types “raintight” and “concrete tight” when installed in wet or damp locations, outdoors and in concrete or masonry construction.
    - c. Fittings shall comply with ANSI C33.84 (latest revision); UL 514 (latest revision); NEMA FB-1.

5. EMT fittings as manufactured by:
  - a. For threaded and non-threaded enclosure, termination connector
    - 1) Thomas & Betts-TC721A (set screw type) Series (with locknuts).
    - 2) Emerson-OZ/Gedney-TC500I (set screw type) Series (with locknuts).
    - 3) Thomas & Betts-5123 (compression type) Series (with two locknuts).
    - 4) Emerson-OZ/Gedney-TC600I (compression type) Series (with locknut).
    - 5) Thomas & Betts-4240 (compression type) Series (90-degree angle with locknut).
    - 6) Emerson-OZ/Gedney-TWL (compression type) Series (90-degree angle with locknut).
  - b. For EMT-to-EMT conduit-to-conduit coupling:
    - 1) Thomas & Betts-TK121A (set screw type) Series (with locknut).
    - 2) Emerson-OZ/Gedney-5000 (set screw type) Series (with locknut).
    - 3) Thomas & Betts-5120 (compression type) Series.
    - 4) Emerson-OZ/Gedney-TC600 (compression type) Series.
- C. Flexible Metal Conduit (FMC)
  1. Round flexible conduit fabricated from a single continuous steel strip. The steel shall be factory formed into continuous interlocking convolutions to form a complete lock between steel strips and provide raceway flexibility.
  2. Metal to metal grounding contact shall be maintained throughout the length of the FMC conduit.
  3. FMC shall be allowed for conduit size ranges from 0.5 inch through 4.0-inches.
  4. FMC shall comply with ANSI-C.33.84 and ANSI C33.92; NEMA FB-1; CEC 12-1100.
  5. FMC Fittings
    - a. FMC fittings shall be malleable iron construction or steel construction.
    - b. Fitting shall automatically cause the FMC raceway throat opening to be centered with respect to the fitting throat opening.
    - c. Straight and angled connector termination fittings shall be threaded on one end and shall include a threaded locknut, suitable for connection to threaded and unthreaded enclosures.
    - d. The attachment of the fittings to FMC shall be angled saddle type, to engage and interlock with the FMC spiral groove, and shall be unaffected by vibration. Direct bearing screw type fittings shall not be used.
    - e. Direct FMC conduit-to-FMC conduit coupling of FMC shall not be permitted.
    - f. Shall comply with ANSI C33.9, and ANSI C33.92 (latest revision); NEMA FB1 (latest revision); UL 514.
  6. FMC fittings as manufactured by:
 

<ol style="list-style-type: none"> <li>a. <u>Straight Termination Connectors</u> <ol style="list-style-type: none"> <li>1) Thomas &amp; Betts-3110 Series (with locknut)</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>a. <u>45- and 90-Degree Angle Connectors</u> <ol style="list-style-type: none"> <li>1) Thomas &amp; Betts-3130 Series (with locknut)</li> </ol> </li> </ol>
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- b. FMC to EMT conduit combination coupling:
      - 1) Thomas & Betts 503TB Series.
- D. Liquid Tight Flexible Metal Conduit (LTFMC)
  - 1. The metal conduit core of LTFMC shall comply with the same Requirements as FMC conduit, with the addition of a thermoplastic exterior flexible jacket over the metal core.
  - 2. The exterior jacket shall be positively locked to the metal core to prevent jacket “sleeving”.
  - 3. The LTFMC shall be rated for installation and operating service temperatures of between minus 20 degrees centigrade through plus 90 degrees centigrade.
  - 4. The LTFMC jacket shall be suitable for continuous exposure to sunlight, rainwater, water vapor, mineral oils, and liquid solvents, without penetrating into the conduit and without deteriorating the jacket.
  - 5. LTFMC sizes from 0.5-inch through 1.25-inch shall include an additional internal ground conductor, fabricated by the Manufacturer, as an integral part of the conduit core.
  - 6. Direct LTFMC conduit-to-LTFMC conduit coupling of LTFMC shall not be permitted.
  - 7. LTFMC shall be allowed for conduit size ranges from 0.5-inch through 4.0-inches.
  - 8. In addition to the Requirements for FMC conduit, LTFMC shall also comply with ANSI C-33.84 (latest revision); NEMA-FB1 (latest revision); CEC 12-1400 (latest revision).
  - 9. LTFMC fittings
    - a. Fittings shall include an external mechanical ground/bond wire connector.
    - b. The attachment of the fitting to LTFMC shall be threaded compression type onto the conduit core with locknut and liquid tight jacket compression seal. The fitting shall automatically prevent “sleeving” of the jacket.
    - c. Straight and angled termination connector fittings shall be threaded on one end and shall include locknut suitable for connection to threaded and unthreaded enclosures.
  - 10. LTFMC fittings as manufactured by:
    - a. Termination connector fittings:
 

<u>Straight</u>	<u>45- and 90-Degree Angle Connectors</u>
1) Thomas & Betts-5331 GR Series.	Thomas & Betts-5341GR & 5351GR Series.
2) Appleton-STB Series; STN-L with preformed Series for use “knockouts”.	Appleton-STB-L Series; STN-L Series for use with preformed “knockouts”.
3) Emerson- OZ/Gedney-4QSeries.	Emerson-OZ/Gedney-4Q Series
- E. Rigid Non-Metallic Conduit (RNMC)
  - 1. General
    - a. Conduit and fittings shall be 90-degree centigrade conductor rated. Fabricated from homogeneous material, free from visible cracks, holes, or foreign inclusions, with integral “end-bell”. The conduit and conduit fittings shall be watertight and airtight.



- b. Conduit, conduit fittings and conduit fitting assembly “solvent cement” shall all be the product of the same Manufacturer. Conduit fittings shall be solvent cement welded watertight.
  - c. Conduit and fittings shall be identified with legible markings showing ratings, size and Manufacturer’s name.
  - d. RNMC and fitting shall be corrosion resistant, watertight.
  - e. Conduit shall be suitable for conductor operating temperatures from minus 20 degrees centigrade to 90 degrees centigrade.
  - f. RNMC shall comply with NEMA TC-2 (PVC 40 conduit, latest revision) NEMA TC-6 (EB conduit latest revision) and NEMA TC-3 (fittings, latest revision); UL 514 and UL 651 (latest revision).
- 2. Polyvinyl Chloride (PVC)-RNMC
    - a. PVC-Schedule 40 heavy wall construction.
    - b. PVC-Schedule 80 extra heavy wall construction.
    - c. PVC-Type EB.
  - 3. RNMC fittings connecting to metallic raceways shall be provided with a ground/bond jumper connection.
- F. Expansion Joint, Deflection Joint and Seismic Joint Conduit Fittings
- 1. Expansion Conduit Fitting: Fitting shall provide for a minimum of 2-inches straight line movement between two connecting conduits in each direction (total 4-inches conduit expansion and contraction) parallel to the respective conduit lengths. Fitting shall be watertight.
  - 2. Deflection Conduit Fitting - Fitting shall provide for a minimum of 30 degrees angular deflection movement (“Shear” deflection) between two connecting conduits, in any direction perpendicular to the length of the respective conduits. Fitting shall be watertight.
  - 3. Combination Expansion/Deflection Conduit Fitting - Fitting shall provide the combined “expansion” and “deflection” movement capacity between two connecting conduits as described for separate “expansion” and “Deflection” conduit fittings. Fitting shall be approved for installation concealed in both masonry/concrete construction and exposed non-masonry/concrete construction. Fitting shall be watertight.
  - 4. Fittings shall comply with UL.
  - 5. Fittings as manufactured by:
    - a. Conduit expansion fittings exposed, or concealed locations as manufactured by:
      - 1) Emerson-OZ/Gedney – AXB-8 Series for RMC conduit.
      - 2) Emerson-OZ/Gedney - TX Series for EMT conduit.
      - 3) Appleton – AXB or XJ8 Series for RMC conduit and EMT conduits. Provide RMC to EMT combination conduit coupling fittings for each end of the expansion fitting.

- b. Combination expansion/deflection conduit fittings exposed, or concealed conduit locations as manufactured by:
    - 1) Emerson-OZ/Gedney - AXDX Series for RMC conduit.
    - 2) Emerson-OZ/Gedney - AXDX Series for EMT conduit.
    - 3) Appleton-DX Series for RMC conduit.
    - 4) Provide RMC to EMT combination conduit coupling fittings for each end of the expansion/deflection fitting.
  - c. Conduit expansion/deflection fittings for FMC and LTFMC conduit.
    - 1) Provide a minimum of 12-inches of “slack” LTFMC in each FMC or LTFMC conduit at building and structure seismic or expansion joint conduit crossings.
    - 2) Note: Each FMC “slack” expansion/deflection location, shall be considered as not less than a 90-degree conduit bend location, for compliance with the maximum quantity of conduit bends allowed in a raceway.
6. Conduit fitting bonding jumper:
- a. The grounding/bonding path of metal conduit shall be maintained by the fitting.
  - b. Provide a bonding jumper at each expansion, deflection, and combination expansion deflection conduit fitting.
  - c. The jumper shall be a bare flexible copper “braid”. The copper braid electrical current carrying capacity shall be equal to the metal conduit.
  - d. Provide a factory terminated ground clamp on each end of the braid with adjusting steel conduit grounding clamps and connect to each respective conduit end.
  - e. The jumper braid length shall be 8-inches longer than the respective conduit fitting.
  - f. Bonding jumper for FMC and EMT fittings as manufactured by:
    - 1) Emerson-OZ/Gedney – BJ and BJE Series
    - 2) Appleton – BJ/XJ Series
- G. Conduit Bodies Conduit Fitting
- 1. Conduit bodies shall provide conductor access with a removable conduit body cover and wiring area enclosed in metal housing. The conduit body shall facilitate pulling conductors.
  - 2. In-line form “C” conduit bodies shall be prohibited.
  - 3. The interior space “length” of 90 degree “elbow” conduit bodies shall not be less than six times the diameter size of the largest conduit connecting to the conduit body.
  - 4. Conduit body covers shall be removable, gasketed; watertight “domed” metal covers “Mogul-Type” with threaded screw attachment to the conduit body.
  - 5. Lubricated, reusable, wire roller guards inside the conduit body shall protect wire from insulation damage during wire “pulling”.
  - 6. Conduit body fittings shall comply with UL 514.

7. Conduit bodies as manufactured by:
  - a. For EMT Conduit
    - 1) Same as for RMC conduit. Provide EMT to RMC conduit combination coupling fitting for each outlet body connection.

## 2.02 CONDUIT SUPPORTS

### A. General

1. Conduit Supports, hangers and fasteners for metal conduit shall be steel, hot dip zinc galvanized.
2. Conduit supports, hangers and fasteners for PVC coated conduit shall be PVC coated to match the conduit PVC coating.
3. Threaded hardware shall be continuous, free running threads.
4. Conduit support systems, including support channels, pipe clamps, braces, anchors, hardware, fasteners, shall be sized to support the full capacity circuit conductors' weight, plus the installed conduit weight, plus the conduit fitting weight and support hardware weight, plus a 300% additional weight capacity safety factor.
5. Provide lock washer at each "bolted"/threaded connection.
6. Conduit supports, fasteners, channels, braces, hardware, anchors, pipe clamps, and hangers as manufactured by Unistrut or Kindorf.
7. Supports shall be free of "BURRS" and sharp edges.
8. Metal supports cut in the field shall be zinc galvanized after cutting to prevent rust.

### B. Conduit Hangers

1. Threaded steel hanger rods.
  - a. Hanger rods smaller than 0.375-inches in diameter shall not be used for support of individual conduits.
  - b. Hanger rods smaller than 0.5-inches in diameter shall not be used for support of multiple conduits.
2. Conduit hanger wires shall be not less than 12-gauge steel.
3. Conduit hangers shall attach to structure fasteners with steel "Clevis" or "Swing" hangers and shall provide a minimum of 45 degrees of angular movement in any direction at the point of the conduit hanger attachment to the structure fasteners.
4. Conduits individually suspended by conduit hangers shall fasten to the respective hangers with "Clevis" type pipe hangers. The pipe hangers shall be steel, adjustable to fit conduit size and shall completely enclose the conduit circumference.

### C. Conduit Support Channels

1. "C" channels shall be factory preformed with a minimum 12-gauge thickness metal. The channel shall be factory "punched" with regularly spaced slotted holes for fastener attachments along the length of the channel.
2. The "C" channel shall not deflect more than 0.1 inch between channel supports at maximum installed design load, including required safety factor.
3. Channels shall comply with ANSI-1008 (latest revision) and ASTM-A569 latest revision).

4. Channels shall provide “turned lips” at longitudinal edges to hold (lock-in) fasteners.
  5. Conduit support channels suspended from conduit hangers shall attach to conduit hangers with treaded connections. Provide a minimum of two hangers (trapeze style) connected to each channel.
  6. Non-suspended conduit support channels shall connect to structure fasteners with threaded connectors.
- D. Fasteners, Seismic Earthquake Rated
1. Channel fasteners:
    - a. Channel fasteners shall “prelocate” and lock into the channel “turned lips” and channel “walls”.
    - b. A separate metal strap shall “tie” each conduit to each channel with conduit channel fasteners.
  2. Structure fasteners:
    - a. Structure fasteners for wall and floor mounted conduit attachments shall attach to existing masonry and concrete structures with structure fasteners using drilled, mechanical, expansion shield anchors.
    - b. Structure fasteners for wall and floor mounted conduit attachments shall attach to new masonry and concrete structures with structure fasteners using steel threaded inserts precast into the structures.
    - c. Structure fasteners shall center the support load above or below the beam flanges and reduce torsion-rotation forces exerted on the structural beam. Attach to steel structural members with “swing-beam clamps”, with set-locking screw structure fasteners.
      - 1) Beam clamps shall include integral safety rod, strap or “J”-hook to secure the attachment clamp to the beam flanges on both sides of the beam, with integral hanger rod attachment.
      - 2) Or double-ended beam clamp to secure the attachment clamp to the beam flanges on both sides of the beam, with integral hanger rod attachment.
    - d. Structure fasteners for wall and floor mounted conduit attachments shall attach to wood structural members with flush “through-bolted” wood beam/wood framing stud structure fasteners.
    - e. Structure fasteners for wall mounted conduit attachments shall attach to steel framing studs and steel structural elements with spot welded steel structure fasteners or drilled and bolted structure fasteners.
- E. Brace Connectors
1. Provide lateral brace connectors to resist horizontal, lateral, and vertical movement of suspended conduits during seismic earthquakes.
  2. The braces shall connect from each conduit support, attach as close to the conduit as possible, and attach to fixed rigid, non-suspended building “main” structural elements with fixed anchoring.
  3. Brace attachment connectors and fasteners shall be rigid preformed steel channels or flexible #10-gauge steel hanger wire.

4. Connect and attach the brace connectors to fixed structural elements in the same manner as conduit support hangers. The connection of braces to structural elements shall be independent of the conduit support hanger structure fasteners.

## **2.03 ELECTRICAL POWER WIRE AND CABLE**

### **A. General**

1. All wire and cable shall be single-conductor, annealed copper, insulated 600 volts, #12AWG minimum unless specifically noted otherwise on the Drawings.
2. Conductors #10AWG and smaller shall be solid. Conductors #8AWG and larger shall be stranded.
3. Insulation of conductor connected to circuit protection devices required to be "100%" rated, shall be 90-degree centigrade rated insulation.
4. Insulation of conductors installed outdoors, on grade or underground, insulation shall be rated for wet locations.
5. Insulation of conductors installed outdoors, installed exposed to the sun, installed in exposed conduits, insulation shall be rated for high-temperature 90 degrees centigrade.
6. Insulation of branch circuit conductors installed in light fixtures; insulation shall be rated for 90 degrees centigrade.
7. Conductor exposed to oil, insulation and jacket shall be oil resistant, complying with "Oil Resistant-1" and "Oil Resistant-2" UL 83.

### **B. Conductor Insulation**

1. 600 Volt AC and/or DC insulated conductors installed entirely inside conduits, or enclosed inside wireways, or enclosed inside raceways, insulation shall be rated as follows.
  - a. Indoor above Grade locations either concealed or exposed.
    - 1) Dual rated THHN and THWN
    - 2) Individually rated THHN-2
    - 3) Individually rated THWN-2
    - 4) XHHW-2
  - b. Outdoor above Grade either concealed or exposed.
    - 1) XHHW-2
    - 2) THWN-2
    - 3) THW-2
  - c. All other enclosed raceway locations not described above.
    - 1) XHHW-2
    - 2) THWN-2
    - 3) THW-2
2. 600 Volt AC and/or DC insulated conductors installed in open cable tray or open wireway or exposed insulation also shall be rated for exposed install locations.

C. Insulation Color Coding and Identification

1. The following color code for branch circuits:
    - a. Neutral . . . White (Tape feeder neutrals with white tape near connections)
    - b. Normal Power

<u>120/208 Volt</u>	<u>480/277 Volt</u>
Ground Green	Ground Green
Phase A Black	Phase A Brown
Phase B Red	Phase B Orange
Phase C Blue	Phase C Yellow
    - c. Isolated ground insulation shall be green with a longitudinal yellow stripe.
    - d. Emergency power same insulation color as normal power except as follows:

<u>120/208 Volt</u>
Provide an additional continuous stripe on each conductor insulation, orange or yellow, except ground
<u>480/277 Volt</u>
Provide an additional continuous stripe on each conductor insulation blue or black, except ground
  2. When individual neutral conductors are shown/required for each branch circuit, the color code for the neutral conductors shall be as follows:
    - a. 120/208 volt; Phase A - White with Black stripe; Phase B - White with Red stripe; Phase C - White with Blue stripe.
    - b. 277/480 volt; Phase A - White with Brown stripe; Phase B - White with Orange stripe; Phase C - White with Yellow stripe.
  3. Feeders identified as to phase or leg in each, switchboard, switchgear, panelboard, and junction location with printed identifying tape.
  4. Color coding for mechanical and plumbing control wiring shall be an agreed upon color code between the Mechanical/Plumbing Contractor and the Electrical Contractor, and color code shall be submitted to the District's Representative in writing for approval prior to installation.
- D. Panel feeders, copper:
1. Wire size shown on the Drawings is for copper conductors, unless specifically indicated otherwise.

**PART 3 - EXECUTION**

**3.01 TRENCHING, FOOTINGS, SLEEVES**

- A. Sleeves
1. Provide sleeves for raceways, conduit and wire/cables passing through the following construction elements:
    - a. Concrete and masonry foundations, floors, walls and slabs.
    - b. Gypsum, Lath, and plaster walls and ceilings.

- c. Building structures (i.e., foundations, walls, floors, ceilings, beams, and roofs) with a fire rating exceeding 20-minutes.
2. Sleeves shall extend 1.5-inch above and below floors, except under floor standing electrical equipment. Sleeves shall be flush with wall ceiling foundations and partitions exposed to public view and extend approximately 0.5-inch past penetration in fire rated construction. Sleeves shall be installed at exact penetration locations and angles to accommodate wire/cable, raceway, and conduit routings.
3. Joists, girders, beams, columns or reinforcing steel shall not be cut or weakened. Where construction necessitates the routing of conduit or raceways through structural members, framing or footings, written permission to make such installation shall first be obtained from the District's Representative. Such permission will not be granted, however, if any other method of installation is possible.
4. The layout and design of raceways and conduits located in or routed through masonry or reinforced beams or the District's Representative shall review walls before any work is performed. All sleeving shall be accomplished according to the instructions of the District's Representative and shall be accepted before any concrete is poured.
5. Sleeves, raceways, and conduit shall be located to clear steel reinforcing bars in beams. Reinforcing bars in walls shall be offset to clear piping and sleeves.
6. Provide a continuous clearance between the inside of a sleeve and exterior of wire/cables, conduits and raceways passing through the sleeve not less than the following:
  - a. 0.5-inch clearance except as required otherwise.
  - b. 1.0-inch clearance through outside walls below grade.
  - c. 3.0-inch clearance through seismic joints.
7. Sleeves set in fire rated construction shall be caulked between sleeve and building structure, additionally sleeves shall be caulked between the sleeve and the wire/cables, conduits/raceways passing through the sleeve. The caulking shall be a fireproof sealant, equal to the fire rating and temperature being penetrated. Clearance between components inside of sleeve and exterior of components passing through sleeve and between components inside the sleeve shall comply with Fireproof Sealant Manufacturer's recommendations.
8. Sleeve material:
  - a. In concrete or masonry walls roofs or ceilings: Schedule 40 black steel pipe. When installed in roofs or outside walls, seal outer surface watertight.
  - b. In fire rated construction; 24-gauge galvanized iron or steel.
  - c. Sleeves through waterproof membranes: Cast iron or Schedule 40 steel with flashing clamp device and corrosion resistant clamping bolts. Caulk space between pipe and sleeve and surfaces between sleeve and conduits sealed watertight.

### **3.02 GROUNDING**

- A. Grounding shall be executed in accordance with all applicable Codes and Regulations, both of the State and local authorities having jurisdiction.

- B. Where nonmetallic conduit is used in the distribution system, the Contractor shall install the proper sized copper ground wire in the conduit with the feeder for use as an equipment ground. The electrical metallic raceway system shall be grounded to this ground wire.
- C. The maximum ground/bond resistance to the grounding electrode shall not exceed 1ohms from any location in the electrical system. The maximum ground resistance of the grounding electrode to earth shall not exceed 5 ohms.
- D. Ground/Bond Conductors
  - 1. Provide an additional, dedicated, green insulation equipment ground/bond wire inside each conduit type and raceway as follows. Size the ground/bond conductors to comply with CEC Requirements. The metal conduit or raceway shall not be permitted to serve (function) as the only (exclusive) electrical ground return path:
    - a. All types of nonmetallic conduit and all types of non-metallic raceways including but not limited to: RNMC - Rigid Nonmetallic Conduit.
    - b. FMC – Flexible Metal Conduit.
    - c. LTFMC – Liquid Tight Flexible Metal Conduit.
    - d. Metal and non-metal raceways.
    - e. EMT – Electrical Metal Tubing.
  - 2. The equipment ground/bond wire shall be continuous from the electrical circuit source point of origin to the electrical circuit end termination utilization point as follows:
    - a. Every conduit and raceway path containing any length of the above identified conduits or raceway.
    - b. Every conduit path and raceway path connected to any length of the above-identified conduits and raceways.
  - 3. The equipment ground/bond wire shall be sized as follows, but in no case smaller than indicated on the Drawings. Install equipment ground/bond wire in each conduit/raceway, with the respective phase conductors:

<u>Feeder, Subfeeders &amp; Branch Circuit Protection</u>	<u>Min. Equip Ground Wire Size</u>
15 amp	#12
20 amp	#12
30 to 60 amp	#10
70 to 100 amp	#8
101 to 200 amp	#6
201 to 400 amp	#2
401 to 600 amp	#1
801 to 1000 amp	2/0
1001 to 1200 amp	3/0
1201 to 1600 amp	4/0
1601 to 2000 amp	250 MCM
2001 to 2500 amp	350 MCM
2501 to 4000 amp	500 MCM

- 4. Isolated grounds - Raceways containing branch circuit or feeder phase conductors connected to panelboards equipment, or receptacles with isolated grounds or isolated ground bus shall contain a dedicated insulated ground conductor connected to the isolated ground system only. The isolated ground conductor shall be continuous the



length of the raceways and connected only to the isolated ground terminals in addition to and independent of the equipment bonding/ground conductor. The isolated ground conductor shall be sized as indicated above, for equipment ground/bond wire.

5. Splices in ground/bond wires shall be permitted only at the following locations:
  - a. Ground buses with listed and approved ground lugs.
  - b. Where exothermic welded ground/bond wire splices are provided.
6. Provide ground/bond wire jumpers for conduit fittings with ground lugs, expansion and deflection conduit fittings at conduit fittings connecting between metallic and non-metallic raceways and to bond metal enclosures to conduit fittings with ground lugs.
- E. Ground conductors for branch circuit wiring shall be attached at each outlet to the back of the box using drilled and tapped holes and washer head screws, 6-32 or larger.

### **3.03 CONDUIT**

#### **A. General**

1. The sizes of the conduits for the various circuits shall be as indicated on the Drawings, but not less than the conduit size required by Code for the size and quantity of conductors to be installed in the conduit.
2. Conduits shall be installed concealed from view. Install conduits concealed in walls, concealed below floors, and concealed above ceilings, except as specifically noted otherwise.
  - a. Conduits shall not be installed in concrete floors.
3. The following systems shall be considered as circuits 100 volts and less, all other circuits shall be considered to be over 100-volts (power circuits) unless specifically noted otherwise: Fire alarm, energy management control, telephone, public address, data, computer, television, intercom, intrusion alarm and nurse call.
4. Conduits shall be provided complete with conduit bends, conduit fittings, outlet boxes, pullboxes, junction boxes, conduit anchors/supports, grounding/bonding for a complete and operating conductor/wire raceway system.
5. Metal and nonmetal conduits shall be provided mechanically continuous between termination connection points. Metal conduit shall be provided electrically continuous between termination connection points.
6. Individual conduit paths and home runs shown on the Drawings shall be maintained as separate individual conduits for each homerun and path.
7. Conduits, conduit fittings and installation work occurring in classified hazardous materials locations shall comply with applicable Code Class 1 Division 1 Requirements, unless specifically noted otherwise.
8. Transitions between conduits constructed of different materials and occurring in above grade locations shall be allowed only at outlet boxes, junction boxes, pull boxes and equipment enclosures unless specifically indicated otherwise. Provide outlet boxes and junction boxes.
9. Metal conduit terminating to nonmetal enclosures; terminating into metal enclosures with "concentric ring" knockouts; terminating into metal enclosures with knockout reducing washers, including but not limited to equipment housings, outlet boxes,

junction boxes, pull boxes, cable trenches, manholes, shall be provided with a ground/bonding lug integrated with the conduit termination conductor fitting construction, by the Fitting Manufacturer. The lug shall provide for connection of a grounding/bonding conductor (insulated or uninsulated). The grounding lug shall be located on the fitting, inside the termination enclosure.

10. The type of conduit, type of conduit fittings, and type of conduit supports, and method of conduit installation shall be suitable for the conditions of use and conditions of location of installation based on the Manufacturer's recommendations; based on the applicable Codes and based on the Requirements of the Contract Documents.

**B. EMT Installation Locations**

EMT conduit and EMT fittings may be installed in the following locations, for circuit conductors operating below 600 volts to ground; locations containing only "non-hazardous materials"; only dry locations:

1. Concealed in hollow non masonry/non-concrete, metal stud frame and wood stud frame walls and floors.
2. Concealed above ceilings.
3. Exposed inside interior enclosed crawl spaces.
4. Exposed interior locations placed 9-feet or higher above finished floors (except as described in paragraph below at lower heights).
5. Exposed on walls and ceilings (any height) in the following dedicated function areas, interior enclosed room locations:
  - a. Indoor enclosed electrical equipment rooms and closets.
  - b. Indoor enclosed data and telecommunication terminal rooms and closets.
  - c. Indoor enclosed HVAC equipment rooms and closets.
6. Any location where FMC is described to be installed, except as the final connection to rotating or vibrating equipment.

**C. FMC Installation Locations**

FMC conduit and FMC fittings may be installed in the following locations for circuit conductors operating below 600 volts to ground; locations containing only "non-hazardous materials"; only dry, interior locations:

1. Concealed in hollow non-masonry metal stud frame and wood stud frame fully enclosed walls.
2. Concealed above fully enclosed ceiling spaces.
3. FMC conduit shall be installed in continuous lengths between termination points. FMC shall not be "spliced" or coupled directly to FMC or any other conduit type under any circumstance.
4. The maximum continuous length of FMC that shall be installed between termination end points is 15-feet. Circuits requiring continuous conduit lengths exceeding 15 feet between termination end points shall be installed using either RMC or EMT conduits. FMC lengths shorter than 16-inches are prohibited.

5. The minimum size FMC conduit shall be as shown on the Drawings but not be less than the following:
  - a. FMC lengths of 6-feet or less, minimum FMC conduit size shall be 0.50-inch.
  - b. FMC lengths exceeding 6-feet, minimum FMC conduit size shall be 1.0-inch.

D. LTFMC Installation Locations

LTFMC conduit and LTFMC fittings shall be installed in the following locations for circuit conductors operating below 600 volts to ground; locations containing only “non-hazardous materials”:

1. Final electrical connection to vibrating or rotating equipment; control and monitoring devices mounted on vibrating and rotating equipment including the following. Minimum conduit length shall not be less than 24-inches:
  - a. Motor, engines, boilers, solenoids, and valves.
  - b. Fixed mounted “shop” (manufacturing) production equipment.
  - c. Fixed mounted food preparation equipment and “kitchen” equipment.
2. All locations where exposed flexible conduit connections are required, both indoor and outdoor.
3. Final connection to indoors electrical transformers. Minimum conduit length shall not be less than 24-inches; maximum conduit length shall not exceed 72-inches.
4. Do not install LTFMC located in environmental air plenums.

E. Conduit Installation

1. Conduit Supports
  - a. Securely and rigidly support all raceways/conduits from the building structure. Raceways/Conduits shall be supported independent of all piping, air ducts, equipment ceiling hanger wires, and suspended ceiling grid systems. Secure conduit to structural element by means of UL listed and approved hangers, fasteners, “C” channels and pipe clamps.
  - b. Provide conduit supports spaced along the length of the conduit as follows:
    - 1) EMT conduit, maximum not to exceed 96-inches on center; within 24-inches of each conduit bend and conduit termination location.
    - 2) FMC and LTFMC conduit, maximum not to exceed 24-inches on center; within 6-inches of each conduit bend and conduit termination location.
  - c. Suspended conduit methods:
    - 1) Individual, suspended raceways/conduits separated by more than 12-inches from any other conduit and suspended from ceilings and roofs shall be supported as follows:
      - a) Conduits smaller than 1.5-inches by means of hanger rods or hanger wires.
      - b) Conduits 1.5-inches and larger by means of hanger rods.
      - c) The conduit shall attach to the hangers with pipe clamps.
    - 2) Suspended raceways/conduits positioned within 24 inches of any other conduit shall be grouped and supported by hanger rods using trapeze type conduit

support channels ("C" channels). Conduits shall individually attach to common channels side-by-side, with pipe clamps.

- d. Non-suspended conduit methods:
    - 1) Individual raceway/conduits placed against wall/ceiling/floors, placed inside hollow wall/ceiling construction or structure framing (i.e., "dry-wall" or plaster hollow wall construction), shall be secured by means of individual pipe clamps and fasteners attached to the framing studs or other structural members and the conduit/raceway.
    - 2) Provide common "C" channel supports for all multiple raceway/conduits placed against vertical or horizontal surfaces and positioned within 24-inches of other raceways/conduits. Attach channels to the framing studs or other structural members. Attach the conduits/raceway individually to common channels, side-by-side, with pipe clamps.
    - 3) The use of toggle bolts is prohibited.
  - e. Conduit rising from floor for motor connection shall be independently supported if extending over 18-inch above floor. Support shall not be to a motor or ductwork, which may transmit vibrations.
  - f. Provide conduit anchoring, conduit support and conduit bracing systems conforming to Earthquake Seismic Zone Requirements. The conduit support/anchoring system capacity shall include the weight of the conduits, conduit fittings, conduit supports, and conductors/wires/cables installed in the conduits plus a 300% safety factor. Submit Shop Drawing details showing each typical conduit anchor, conduit support and conduit brace location. Submit structural calculations performed by and signed by a Professional Structural Engineer (P.E.) with a P.E. license, registered in the State of California, U.S.A.
2. Conduit separation:
- a. Separation of conduits entering termination points or crossing other conduits may be reduced as required within 60-inches of the termination or crossing points.
  - b. Conduits shall be separated from hot water piping, exhaust flues/chimneys, steam piping, boilers, furnaces, ovens by a minimum of 12-inches.
3. Conduit stubs:
- a. Branch circuit and telephone conduits turned up from floor at the following locations shall terminate each conduit in a flush conduit coupling at the floor and then extend into partition or to equipment. Refer to District's Representative's Drawings for location of walls and partitions.
    - 1) Interior demountable partitions.
    - 2) Below, into or adjacent to equipment not installed directly adjoining to a wall.
    - 3) Up from below the floor into hollow stud frame walls.
  - b. From each panel, and signal cabinet which is wall mounted, stub up from top of the panel/cabinet a minimum of three 1-inch conduits to the nearest accessible ceiling spaces or other accessible location. Where the floor below the panel is accessible or is a ceiling space, stub an additional three 1-inch conduits from the bottom of the panel into the accessible space below the panel. Cap conduits for future use.

- c. Conduits stubbed into ceiling or floor spaces from outlets for telephone, video, computer/data or television shall be provided with an insulated throat bushing, on the end of each conduit stubout.
  - d. Conduit stub-outs from outlet boxes and equipment located in hollow stud walls, into ceiling and floor spaces, shall be EMT or RMC conduit. The stub-outs shall terminate into the ceiling and floor spaces with a conduit termination connector fitting.
  - e. Empty conduit stubs into building spaces and equipment shall be individually identified with an "ID-tag" located at each end of the conduit. The ID-tag shall state the origination point and termination point of the respective conduit (i.e., "from PNL-A/to Room #121"; "from outlet #24/to outlet #17 in Room #120"; etc.).
  - f. Provide a conduit termination fitting with insulated throat bushing and mechanical ground lugs at each conduit "stub-up" location.
4. Raceway/Conduits, which are installed at this time and left empty for future use, shall have 0.25-inch diameter polyvinyl rope left in place for future use. The pull rope shall be 500-pound minimum tensile strength. Provide a minimum of 5-feet of slack at each end of pull ropes.
  5. Unless otherwise restricted by Structural Drawings and specifications, the maximum size conduit permitted in concrete slab on-grade, walls, ceilings and roofs constructed of masonry or concrete shall not be greater than 20% of the concrete/ masonry thickness. Conduits installed in these locations shall not cross.
    - a. Conduits shall not be installed in cast-in-place concrete floors.
  6. Provide openings in building structures for conduit penetrations:
    - a. New construction shall be provided with conduit sleeves, to provide conduit penetrations.
    - b. Existing construction shall be drilled (core drill masonry and concrete) and provide conduit sleeves installed after drilling, to provide conduit penetrations.
  7. Conduit bends risers and offsets:
    - a. The minimum bend radius of "factory or field" fabricated conduit bends shall not be less than the following. The bend radius shall be measured at the surface, inside radius of the conduit wall:
      - 1) LTFMC conduit - conduit minimum bend radius 12-times the conduit diameter.
      - 2) RMC and EMT conduit minimum bend radius - conduit for power circuits over 100 volts and less than 600 volts, 8-times conduit diameter. Conduit for power circuits over 600 volt, 12-times conduit diameter. Conduit for low voltage, signal and fiber optic circuits, 10-times conduit diameter.
      - 3) RNMC conduit - conduit minimum bend radius 36-times the conduit diameter. Under building reduce minimum bend radius to 10-times the conduit diameter. Conduit bends and offsets in RNMC with less than 36-times conduit diameter bend/offset radius shall be RNMC PVC Schedule 80 or PVC coated RGS.

- b. Bends and offsets in conduits shall be kept to an absolute minimum. The total summation of all bends and offsets permitted in a conduit segment, occurring between two conduit termination/connection end points, shall not exceed the following, including conduit fittings:
    - 1) EMT conduit - 360 angular degrees
    - 2) FMC and LTFMC conduit - 180 angular degrees
    - 3) RNMC conduit - 270 angular degrees
  - c. Each field fabricated conduit offset, bend and elbow which are not the standard product of the Raceway/Conduit Manufacturer shall be mandrel tested. The test shall be conducted after the conduit installation is complete and prior to pulling-in any wire, in the same manner as for underground conduits.
  - d. Factory manufactured angle connector conduit fittings shall be installed in exposed conduit locations only. Installation in locations normally concealed from view shall not be permitted. Not more than one factory manufactured angle connector shall be permitted in any length of conduit between conduit termination end points.
  - e. RNMC conduit risers from below grade shall be PVC coated RGS. Conduit risers, bends or offsets entering into a building shall be PVC coated RGS.
  - f. If three or more conduit-bends of the same conduit size and same conduit material type, installed, as part of the Contract Work, fail to comply with the required minimum conduit bend radius or conduit angular degree limits. The following corrective actions shall occur:
    - 1) The Contractor shall remove all the non-complying conduit bends and the respective wire in the conduit from the project site. Provide new conduit and wire, complying with the Contract Documents.
    - 2) Where the conduit bends similar to the non-complying conduit bends are installed concealed in walls, floors, above ceilings or below grade, the Contractor shall expose the conduit bends to allow visual observation.
    - 3) The Contractor shall remove the non-complying conduit bends and dispose of the Project site. The Contractor shall provide new conduit bends and conductors complying with the Contract Documents.
    - 4) All the costs to correct the deficient material and work along with costs to repair the direct, indirect, incidental damages and contract delays shall be the sole responsibility of the Contractor and shall be included in the bid price.
8. Expansion joint, deflection joint and seismic joint fittings.
- a. Provide a conduit expansion fitting for each conduit length and conduit type as follows (Note - The installation of specified combination expansion/deflection fittings at seismic joints shall satisfy this Spacing Requirement also):
 

<u>Conduit Type</u>	<u>Conduit</u>	<u>Fitting Length Spacing</u>
1) EMT	Exposed exterior locations	200-feet
2) EMT	Interior weather protected locations	400 feet
  - b. Provide a conduit combination expansion/deflection fitting for each conduit, crossing the following elements:
    - 1) At each building or non-building structure seismic joint.

- 2) At each building on non-building structure expansion joint.
  - 3) At each conduit penetration of a “sound-rated” wall, floor, or ceiling.
9. Provide two locknuts and an insulated throat bushing at each metal conduit terminating at enclosures, including but not limited to outlet boxes, junction boxes, terminal cabinets, switchgear, transformers, switchboards, distribution panels and panelboards.
  10. Provide metallic or plastic closure caps on all conduit ends during construction, until installation of conductors in the respective conduit.
  11. Conduit run exposed, shall be run at right angles or parallel to the walls or structures. All changes in directions, either horizontally or vertically, shall be made with conduit outlet bodies as manufactured by Crouse Hinds, OZ or equal. Conduits run on exposed beams or trelliswork shall be painted to match surrounding surfaces.
  12. Rigid steel conduit or electrical metallic tubing shall not be strapped or fastened to equipment subject to vibration or mounted on shock absorbing bases.
  13. RNMC conduit:
    - a. Joints and fittings shall be solvent welded to RNMC conduit. Joints and fittings shall be watertight and airtight after fabrication.
  14. Tighten each conduit fittings and fitting appurtenance, to the “torque” (allowable tolerance  $\pm 5\%$ ) value recommended by the Fitting Manufacturer and applicable Code. If three or more conduit fittings are found to not be in compliance with the Manufacturer’s “torque” (tightness) recommendations, the following corrective actions shall occur:
    - a. The Contractor shall tighten “re-torque” the defective fittings and all similar conduit fittings installed as part of the Contract Documents in the presence of the District’s Representative.
- F. Conduit Seals
1. Conduit seals shall be installed in locations where the fitting is visible and accessible.
- G. Nailing Shields
1. Provide “nail” shields where FMC conduit and conductors not installed in a conduit are installed through wood stud and wood frame construction. The nail shield shall provide a barrier resistant to “nailing” fasteners through the stud and penetrating into the FMC and conductors.
  2. The nail shields shall be flat nominal 1.5-inch by 3-inches, 14-gauge steel, and hot dip zinc galvanized with “nailing spurs”.
  3. Provide nailing shields on the front face and rear face of each FMC penetration. The shield shall be centered on each penetration through the respective framing, stud framing blocking, and stud framing plates.
- H. Conduit Bodies
1. Conduit bodies shall be installed in exposed conduit locations only or above accessible ceilings.
  2. Conduit bodies shall be accessible for removing body cover and pulling wire through the conduit body.
  3. Conduit bodies shall not be installed inside enclosed walls.

- I. Preparation of Reuse of Existing Conduits
  1. Prepare existing conduits shown to be reused as part of Contract Work as follows: Complete the required work prior to installing any conductors or cables in respective existing conduits.
    - a. "Rod" out existing raceways to be used under this contract, with approved test and flexible mandrels to remove all obstructions to clear debris from inside conduits.
    - b. Use test mandrels at least 12-inches long, 0.25-inch less than diameter of duct at center, tapering to 0.5-inch less than duct size at ends.
  2. If test mandrels cannot be pulled through raceways, Contractor shall perform the following to clear the existing raceways:
    - a. Force rigid or semi-rigid rods through the raceways to clear the obstructions from one to both ends of the raceway.
    - b. Force a power-driven rotating router device through the conduit from one or both ends of raceways. Device shall incorporate small diameter cutting blades. Repeat the "router" process in incremental stages to a cutting blade diameter approximately 1/8-inch smaller than the raceway inside diameter.
  3. After clearing the raceway of obstructions, pull a test mandrel or brush through the raceway to clear the remaining debris from the raceway.

### **3.04 WIRE AND CABLE**

- A. Branch circuit and fixture joints for #10AWG and smaller wire shall be made with UL-approved connectors listed for 600 volts, approved for use with copper and/or aluminum wire. Connector to consist of a cone-shaped, expandable coil spring insert, insulated with a nylon shell and two wings placed opposite each other to serve as a built-in wrench or shall be molded one-piece as manufactured by 3M-"Scotchlok".
- B. Branch circuit joints of #8AWG and larger shall be made with screw pressure connectors made of high strength structural aluminum alloy and UL-approved for use with both copper and/or aluminum wire as manufactured by Thomas & Betts. Joints shall be insulated with plastic splicing tape, tapered half-lapped and at least the thickness equivalent to 1.5-times the conductor insulation. Tapes shall be fresh and of quality equal to Scotch.
- C. Use UL listed pulling compound for installation of conductors in conduits.
- D. Correspond each circuit to the branch number indicated on the panel schedule shown on the Drawings except where departures are approved by the District's Representative.
- E. All wiring, including low voltage, shall be installed in conduit.
- F. Control wiring to conform to the wiring diagrams shown on the Mechanical Drawings and the Manufacturer's wiring diagrams.
- G. All splices in exterior pull boxes and light poles shall be cast resins encapsulated.
  1. Power conductor splices - 3M Scotchcast Series 82/85/90; Plymouth or equal.
  2. Control and signal circuits 3M Scotchcast Series 8981 through 8986, Plymouth or equal.
- H. Neatly group and lace all wiring in panelboards, motor control centers and terminal cabinets with plastic ties at 3-inch on centers. Tag all spare conductors.



### 3.05 TESTING

#### A. Testing Conduit and Conduit Bends

The Contractor shall demonstrate the usability of all underground raceways, and field fabricated conduit bends installed as part of this Contract.

1. A round tapered segmented semi-rigid mandrel with a diameter approximately ¼-inch smaller than the diameter of the raceway, shall be pulled through each new raceway.
2. The mandrel shall be pulled through after the raceway installation is completed. Conduits which stubout only, may have the mandrel pulled after the concrete encasement is completed, but prior to completing the backfill.
3. District's Representative shall witness the raceway testing for usability. A Representative of the respective Utility Company shall witness the raceway testing where applicable.
4. Contractor shall repair/replace any conduit and conduit bend provided under this Contract which will not readily pass the mandrel during this test.

END OF SECTION 26 05 30  
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**SECTION 26 56 68**  
**SPORTS FLOODLIGHTING**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Work Included: All labor, materials, appliances, tools, equipment, necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to, the following:
  - 1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 26.
  - 2. General Provisions and Requirements for electrical work.

**1.02 APPLICABLE STANDARDS (ADDITIONAL REQUIREMENTS)**

- A. UL Listing - There shall be provided a UL listing for all electrical components from its connection to the feeder conductors, to its completion at the lamp socket including all connections. This listing shall be based upon UL testing and evaluation of the compatibility of the enclosures and the components for use in combination in this application in addition to the individual components being UL listed or recognized.
- B. Codes - Sports Lighting Structure shall meet California Electrical Code and NEMA publication FA-1.

**1.03 WARRANTY (ADDITIONAL REQUIREMENTS)**

- A. Manufacturer shall warrant in writing the luminaires to be free from defects in materials and workmanship for a period of 7-years starting from the date of delivery.
- B. Manufacturer agrees in writing to provide labor and materials for a period of 2-years to replace defective parts or repair defects in workmanship, or, at its election, to pay reasonable costs of labor for such repairs. For the remainder of the warranty period, replacement materials will be provided at no charge.
- C. Lamps shall be warranted by the Manufacturer in writing not to fail for 2-years from the date of delivery. Lamps, which fail during the first year of the warranty period, will be replaced and installed at no cost to the Owner. The Manufacturer will replace lamps, which fail during the second 12 months, but installation will be the Owners responsibility.
- D. Manufacturer warrants in writing accurate alignment of the luminaires on the luminaire assembly for a period of 7-years starting from the date of delivery.

**1.04 EQUIPMENT QUALIFICATIONS**

- A. The Basis of Design Manufacturer is Cooper Ephesus Lumasport 8 series or approved equal.
- B. Substitutions (Additional Requirements)
  - 1. Failure to provide any of the following information with the alternate submittal will be grounds for rejection of the alternate. Each item listed below shall be provided in the form of clear and concise statements and/or Plans and Drawings, which can be easily read and clearly interpreted. Each item shall also be clearly lettered to correspond with

the following list. All items shall be assembled in the order indicated and secured or bound in a neat and orderly fashion for easy use and reference. If Contractor wishes to propose a substitution to the specified system, the following items shall be submitted with the substitution request:

- a. Lighting layout design showing luminaires mounting heights, aiming focus points, reflector types, number of luminaires per pole and kilowatt consumption.
- b. A Drawing of the Sports Lighting Structure meeting or exceeding specified criteria.
- c. Computer generated point-by-point analysis of field light values as set forth in accordance with Lighting Performance Specifications.
- d. Computer generated spill/glare analysis in accordance with Lighting Performance Specifications.
- e. Written statements of model number and Manufacturer for all equipment bid.
- f. Written warranty from the Manufacturer covering luminaires as outlined in Specifications.
- g. Certified Engineer, independent of Manufacturer, shall verify and stamp wind load test of luminaire assembly to meet or exceed structural strength as described in Specifications.
- h. Manufacturer shall submit in writing a minimum of five similar lighting projects in the State of California where the Specifications outlined have been met. Include the project name, contact person, and telephone numbers.
- i. Manufacturer shall submit a letter guaranteeing the foot-candle levels and uniformities as specified will be met. In addition, Manufacturer's remedy to deficiencies will be noted.

#### **1.05 SUBMITTALS (ADDITIONAL REQUIREMENTS)**

UL Test Report - Bidder shall submit copies of the complete Underwriters Laboratory report covering the entire luminaires assembly. This document, per U.L. practice, shall become the property of the Owner and be filed as a permanent record for the Owner's protection in the event of product malfunction. Partial UL files will not be accepted per the Requirements of UL.

### **PART 2 - PRODUCTS**

#### **2.01 LIGHTING SYSTEM**

- A. General Description - The Lighting System shall consist of:
  1. Luminaires including Lighthouse, Yoke and Driver Box.
  2. Slip fitter for each luminaire– Tenon Mounting for Round Pole.
  3. Air Mesh Hub – Wireless Lighting Control System.
- B. Luminaires
  1. 5700k, 70 CRI.
  2. Dimming Range 0-100%
  3. Operating Temperature -40 degree C to + 40 degree C
  4. NEMA 4X

5. EPA 1.8 square feet
  6. Approximate weight – 67.5 lbs.
  7. Driver Box - High Voltage, Air Mesh Control
- C. Slip Fitter – Tenon Mount for Round Pole
1. Tenon/pole mount with 2 $\frac{3}{8}$ -inch or 3 $\frac{1}{2}$  inches outer diameters. Field verify required. diameter.
- D. Air Mesh Hub – Wireless Lighting Control System
1. 15.5 inches x 13.5 inches x 7.7 inches deep enclosure.
  2. Five-button pre-programmed switch provides control of all lights at specified dimming levels (0%, 25%, 50%, 75%, 100%).
  3. Communicates through LAN connection, WiFi or through cellular network.
  4. FCC/IC certified.

## **PART 3 - EXECUTION**

### **3.01 WEIGHT AND SIZE**

Weight and Size - To permit ease of handling of material at the job site and to avoid damage to the existing facility, no single component of the pole shall be in excess of 4,690 lbs., nor be greater than 41 feet in length.

### **3.02 ELECTRICAL WIRING**

The pole and the luminaires shall be installed such that that no wiring shall be exposed to sun or weather as it transitions through the pole and to the luminaire. All wiring to be concealed in pole and luminaire.

### **3.03 FIELD CONNECTIONS**

All field electrical connections on the pole shall be achieved by U.L. listed plug-in or lug method of attachment from the load side of the breaker/disconnect to the lamp socket. The feeder and grounding conductors from the service entrance to the pole shall be connected at the pole by landing lugs.

### **3.04 TESTING (ADDITIONAL REQUIREMENTS)**

- A. All testing will be done with entire facility illuminated.
- B. Horizontal foot-candle readings shall be taken with the meter positioned horizontal 36 inches above grade.
- C. Maximum foot-candles shall be taken with the test cell positioned 36 inches above grade and aimed at the brightest light source.
- D. Ambient light levels shall be measured at the specified test stations. Maximum ambient foot-candle level explored in all planes for each test station shall be recorded. Once the maximum spill light readings have been recorded, subtract the ambient light readings from the respective foot-candle readings at each test station.
- E. Testing equipment for measurement of foot-candle levels shall be a calibrated Gossen Panalux Electronic 2 or an approved equal.

- F. For final approval of the project, the Manufacturer shall provide a final report from the test results that shall provide the following items:
1. Identification of number and location of the test stations.
  2. Actual horizontal foot-candle readings taken at each test station.
  3. Actual spill/glare foot-candle readings taken at each test station.
  4. Number of hours of operation.

END OF SECTION 26 56 68  
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**SECTION 31 22 00  
GRADING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Coordinate work of this Section to compliment and coordinate with field conditions and Civil Drawing noted specific referenced requirements. Utilize the most stringent requirements.
- B. Removal of topsoil.
- C. Rough grading and consolidation/compaction the site for site structures.
  - 1. Preparation for excavation, trenching, backfilling and compacting Work.
- D. Excavation of subsoil, stockpiling for later reuse, and removal of excess from the site.
- E. Preparing of subgrade for walks, pavements and site retaining walls.
- F. Excavating, backfilling and compaction for wet utility lines.
- G. Finish grading.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 23 16 - Excavation.
- B. Section 31 23 23 - Fill: Filling and compaction.
- C. Section 32 13 13 - Site Concrete.

**1.03 SUBMITTALS**

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.
  - 1. Accurately record location of all changes in finish elevations and gradients which materially affect drainage.

**1.04 QUALITY ASSURANCE**

- A. Regulatory Requirements: For conditions not covered in this Section, refer to applicable provisions of the California Building Code (CBC), Chapter 18A - Soils and Foundations, as amended and adopted by authorities having jurisdiction.
- B. Perform Work in accordance with locally adopted standards.

**1.05 PROTECTION**

- A. Dust Control: Comply with requirements specified in Section 01 50 00 - Temporary Facilities and Controls.
- B. Protection:
  - 1. Comply with general requirements specified in Section 01 50 00 - Temporary Facilities and Controls.
  - 2. Provide protection for walks, curbs, drains, and trees and boxing around corners of existing buildings to prevent damage.

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3. Keep adjacent roads, streets and drives clear of dirt and debris from earthwork operations.
- C. Underground Utilities:
1. Buried utility lines may exist.
  2. If such are encountered, notify Architect and District and for directions to be followed for preservation, relocation or demolition of utilities.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Topsoil: See Section 31 23 23.
- B. Shoring and Bracing: Provide all materials and services necessary to properly engineer and construct shoring for excavations. Selection of materials and design of shoring, underpinning and bracing of new and existing structures shall be solely the responsibility of the Contractor.
  1. Shoring design shall comply with State of California Trenching and Shoring Manual issued by Offices of Structure Construction; 2011.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.
- C. Upon discovery of unknown utility or concealed conditions, discontinue affected Work and notify Architect and District for direction. Unforeseen conditions shall be resolved in accordance with the General Conditions.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
  1. Maintain and protect existing utilities remaining which pass through Project area.
- D. Notify utility company to remove and relocate utilities, as required.
- E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- G. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- H. Protect plants, lawns, and other features to remain as a portion of final landscaping.

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### 3.03 ROUGH GRADING

- A. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, in excess of 1 inch in size.
- B. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- C. Do not remove topsoil when wet.
- D. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- E. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- F. When excavating through roots, perform work by hand and cut roots with sharp axe.
- G. See Section 31 23 23 for filling procedures.
- H. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- I. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.
- J. Grade top perimeter of excavations to prevent surface water from draining into excavation.
  - 1. Provide dewatering of excavations as required to ensure suitable conditions for concrete and backfilling operations.
- K. Uniformly grade areas as shown on Drawings to tolerances specified in this Section..
  - 1. Evenly grade between points where elevations are shown or between points of Work and existing grades.
- L. Slope rough grade away from building perimeter at gradient indicated.
  - 1. Unpaved area slope for a distance of 10 feet from the building: Not less than one unit vertical in 20 units horizontal or 5 percent.
    - a. CBC Section 1804A.4.
  - 2. When supported by soil conditions and climate; slope not less than 1:48 or 2 percent in unpaved areas.
    - a. CBC Section 1804A.4, Exception.
- M. Make grade changes gradual. Blend slopes into level areas.

### 3.04 SOIL REMOVAL AND STOCKPILING

- A. Stockpile topsoil to be re-used on site; remove remainder from site.
  - 1. Topsoil and vegetation layers, root zones, and similar surface materials should be stripped and stockpiled for either reuse in landscape surface areas or removed from the site.
- B. Stockpile subsoil on site for backfill, if soil is appropriate.
  - 1. Stockpile subsoil to depth not exceeding 8 feet.
- C. Remove all lumped subsoil, boulders and rock in excess of 3 inches in greatest dimension.
- D. Stockpile subsoil to be re-used on site; remove remainder from site.

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- E. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; cover to protect from erosion.

**3.05 FINISH GRADING**

- A. Before Finish Grading:
  - 1. Verify building and trench backfilling have been inspected.
  - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
  - 1. Comply with CBC Section 1804A.3.
- C. Where topsoil is to be placed, scarify surface to depth of 6 inches.
- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches.
- E. Place topsoil in areas indicated.
- F. Place topsoil where required to level finish grade.
- G. Place topsoil during dry weather.
- H. Remove roots, weeds, rocks, and foreign material while spreading.
- I. Near plants spread topsoil manually to prevent damage.
- J. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- K. Lightly compact placed topsoil.
- L. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

**3.06 TOLERANCES**

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).
- C. Top Surface Under Paving: Plus or minus 0.04 foot (1/2 inch) from required elevation.

**3.07 REPAIR AND RESTORATION**

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

**3.08 FIELD QUALITY CONTROL**

- A. See Section 31 23 23 for compaction density testing.
- B. Field Quality Control:

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1. Field inspections and testing shall be performed in accordance with requirements specified in Section 01 40 00 and 01 45 33.
  2. Make required quality control submittals in accordance with requirements specified.
- C. Non-compliance: Should grade elevations, tests of fill or backfill indicate non-compliance with required elevations or density, Contractor shall over-excavate, recompact and retest until specified grade or density is obtained.
1. Costs and Time associated with remedial Work and retesting shall be in accordance with provisions of the General Conditions.
  2. Retesting to demonstrate compliance shall be by a testing laboratory acceptable to District and shall be at Contractor's expense.

**3.09 CLEANING**

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

**3.10 PROTECTION**

- A. Protect completed grading from erosion from weather and traffic.
- B. Over-excavate and recompact areas damaged by construction activities and weather.

**END OF SECTION**

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**SECTION 31 23 16  
EXCAVATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating for footings, paving, site structures, and utilities within the building.
- B. Trenching for utilities outside the building to on-site existing utilities.
- C. Temporary excavation support and protection systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring. General requirements for dewatering of excavations and water control.
- B. Section 02 41 00 - Demolition: Shoring and underpinning existing structures.
- C. Section 31 22 00 - Grading: Grading.
- D. Section 31 23 23 - Fill: Fill materials, backfilling, and compacting.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - Safety and Health Regulations for Construction.

**1.04 REFERENCE STANDARDS**

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Temporary Support and Excavation Protection Plan.
- C. Project Record Documents: Record drawings at project closeout according to 01 70 00 - Execution and Closeout Requirements. Show locations of installed support materials left in place, including referenced locations and depths, on drawings.
- D. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

**1.06 QUALITY ASSURANCE**

- A. Temporary Support and Excavation Protection Plan: (if required)
  - 1. Indicate sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property.
  - 2. Include drawings and calculations for bracing and shoring.
  - 3. Bracing and shoring design to meet requirements of OSHA's Excavation Standard, 29 CFR 1926, Subpart P.
- B. Designer Qualifications: For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in California.

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- C. Shoring Installer Qualifications: Company specializing in performing the shoring and bracing work of this section with minimum five years of documented experience.

**1.07 COORDINATION OF SPECIFICATION REQUIREMENTS**

- A. Coordinate these Specification Section requirements with specifications included on Drawings. Comply with more stringent requirements and with those requirements of authorities having jurisdiction.
- B. Comply in full with the direction (recommendations) given in the Geotechnical Report.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Bedding and Fill to Correct Over-Excavation:
  - 1. See Section 31 23 23 for bedding and corrective fill materials at general excavations.

**PART 3 EXECUTION**

**3.01 DIG ALERT NOTIFICATION**

- A. Before any excavation in or near the public right-of-way, contact the Underground Service Alert of Southern California (Dig Alert) at 811 for information on buried utilities and pipelines.
- B. Delineation of the proposed excavation site is mandatory. Mark the area to be excavated with water soluble or chalk based white paint on paved surfaces or with other suitable markings such as flags or stakes on unpaved areas.
- C. Call at least Two (2) full working days prior to digging.
- D. If the members (utility companies) have facilities within the work area, they will mark them prior to the start of your excavation and if not, they will let you know there is no conflict. A different color is used for each utility type (electricity is marked in red, gas in yellow, water in blue, sewer in green, telephone and cable TV in orange).
- E. The Law requires to hand expose to the point of no conflict 24 inches on either side of the underground facility, to know its exact location before using power equipment.
- F. If caught digging without a Dig Alert ticket fines can be as much as \$50,000 per California government code 4216.

**3.02 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.
  - 1. Resurvey benchmarks during installation of excavation support and protection systems and notify District if any changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.
- C. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by Architect. If the proposed

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excavation extends more than 1 foot into the prevailing groundwater, control groundwater intrusion with a comprehensive dewatering procedures, or as directed by Geotechnical Engineer.

**3.03 PREPARATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- D. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

**3.04 TEMPORARY EXCAVATION SUPPORT AND PROTECTION**

- A. Excavation Safety: Comply with OSHA’s Excavation Standard, 29 CFR 1926, Subpart P.
  - 1. Excavations in stable rock or in less than 5 feet in depth in ground judged as having no cave-in potential do not require excavation support and protection systems.
  - 2. Depending upon excavation depth, time that excavation is open, soil classification, configuration and slope of excavation sidewalls, design and provide an excavation support and protection system that meets the requirements of 29 CFR 1926, Subpart P:
    - a. Sloping and benching systems.
    - b. Support systems, shield systems, and other protective systems.
- B. Shoring Design: Comply with State of California Trenching and Shoring Manual issued by Offices of Structure Construction; 2011.
  - 1. Provide all materials and services necessary to properly engineer and construct shoring for excavations. Selection of materials and design of shoring, underpinning and bracing of new and existing structures shall be solely the responsibility of the Contractor.
- C. Underpin adjacent structures that could be damaged by excavating work, including utilities and pipe chases.
- D. Protect excavations from cave-in and from loose soil and other matter from falling in.
- E. Leave excavation support and protection systems, used as formwork or within 10 feet of existing foundations, permanently in place, unless otherwise noted.
  - 1. Cut off top 4 feet below grade, abandon remainder.
- F. Excavation support and protection systems not required to remain in place may be removed subject to approval of District or District's Representative.
  - 1. Remove temporary shoring and bracing in a manner to avoid harmful disturbance to underlying soils and damage to buildings, structures, pavements, facilities and utilities.

**3.05 EXCAVATING**

- A. Excavate to accommodate construction operations, paving/site structures, and paving/site structures.
  - 1. Excavate to the specified elevations.

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2. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.
  3. Cut utility trenches wide enough to allow inspection of installed utilities.
  4. Hand trim excavations. Remove loose matter.
  5. Excavate subsoil from areas to be filled with structural fill, to construct foundations, footings, slabs on grade, paving and to achieve final finish grades.
  6. Over-excavate to working elevations for backfilling and compaction operations.
  7. Where excavations are made to a depth greater than that indicated, such additional depth shall be filled with concrete having the same compressive strength as specified for the footing.
    - a. Correct unauthorized and erroneous excavation at no change in Contract Time or Contract Sum.
    - b. All over-excavations should extend to a depth where the project geologist, engineer or his representative has deemed the exposed soils as being suitable for receiving compacted fill. The materials exposed at the bottom of excavations should be observed by a representative of the geotechnical engineer or geologist from our office prior to the placement of any compacted fill soils to verify that all old fill is removed. Additional removals may be required as a result of observation and/or testing of the exposed subgrade subsequent to the required over-excavation.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored, per CalOSHA requirements for Type C Soil.
1. Machine slope banks of excavations to minimum 1 to 1 ratio horizontal to vertical or angle of repose, if less, until shored.
    - a. Exception: If authorized in writing by Geotechnical Engineer.
    - b. Slope must comply with local codes, ordinances and requirements of agencies having jurisdiction.
    - c. See Section 00 31 00 - Available Project Information.
- D. Do not interfere with 45 degree influence line of bearing splay of foundations.
1. Avoid interference at footings by providing additional width, depth, and other provisions.
- E. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
- F. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

**3.06 SUBGRADE PREPARATION**

- A. See Section 31 23 23 for subgrade preparation at general excavations.

**3.07 FILLING AND BACKFILLING**

- A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.

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- B. See Section 31 23 23 for fill, backfill, and compaction requirements at general excavations.
- C. See Section 31 22 00 for rough and final grading and topsoil replacement requirements.

**3.08 REPAIR**

- A. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 23 23 at no additional cost.

**3.09 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

**3.10 CLEANING**

- A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 22 00.
- B. Remove excavated material that is unsuitable for re-use from site.
- C. Remove excess excavated material from site.

**3.11 PROTECTION**

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

**END OF SECTION**

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**SECTION 31 23 23**  
**FILL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Filling, backfilling, and compacting for footings, paving, site structures, and utilities within the building.
- B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 31 22 00 - Grading: Removal and handling of soil to be re-used.
- C. Section 31 22 00 - Grading: Site grading.
- D. Section 31 23 16 - Excavation: Removal and handling of soil to be re-used.

**1.03 DEFINITIONS**

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: Indicated on drawings.

**1.04 REFERENCE STANDARDS**

- A. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
- C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- D. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- E. DTSC-Clean Fill - California Department of Toxic Substances Control - Clean Imported Fill Material.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Compaction Density Test Reports.
- C. Manufacturer's Qualification Statement.

**1.06 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

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- B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where agreed to.
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.

**1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 FILL MATERIALS**

- A. General Fill: Subsoil excavated on-site.
  - 1. Graded.
  - 2. Free of lumps larger than 3 inches, rocks larger than 3 inches, and debris.
  - 3. Complying with ASTM D2487 Group Symbol CL.
- B. Structural Fill: Subsoil excavated on-site.
  - 1. Graded.
  - 2. Free of organic matter, debris, and oversize particles (e.g., cobbles, rubble, etc. that are larger than 3 inches, rocks larger than 3 inches. Fill shall contain at least fifty percent of material smaller than 1/4 inch in size.
  - 3. Complying with ASTM D2487 Group Symbol CL.
- C. Concrete for Fill: See Section 03 30 00; compressive strength of 2,500 psi.
  - 1. Exception: Concrete used under footings and foundations to correct over-excavation shall be same as for footings and foundation.
- D. Granular Fill- Fill Type GM, GW: Coarse aggregate, conforming to Uniform Standard Specifications for Public Works Construction Off-Site Improvements standard.
- E. Granular Fill - Pea Gravel: Natural stone; washed, free of clay, shale, organic matter.
  - 1. Grade in accordance with ASTM D2487 Group Symbol GP.
- F. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter.
  - 1. Grade in accordance with ASTM D2487 Group Symbol SP or SW.
- G. Topsoil: Topsoil excavated on-site.
  - 1. Unclassified.

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- a. The soil shall be tested for potential contamination in accordance with DTSC-Clean Fill protocols.
- 2. Graded.
- 3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
- 4. Acidity range (pH) of 5.5 to 7.5.
- 5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.
- 6. Complying with ASTM D2487 Group Symbol OH.
- 7. Limit decaying matter to 5 percent of total content by volume.
- H. Type F - Subsoil: Reused, free of rocks larger than 3 inch size, and debris.
  - 1. Existing fill and alluvium or older alluvium may be considered suitable for re-use as compacted fills provided the recommendations of the geotechnical report and observations of the geotechnical engineer are followed.

**2.02 SOURCE QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the Work.
- D. Comply with EPA/DTSC-Clean Fill requirements.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey bench marks and intended elevations for the Work are as indicated.
- B. Identify required lines, levels, contours, and datum locations.
- C. See Section 31 22 00 for additional requirements.
- D. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- E. Verify structural ability of unsupported walls to support imposed loads by the fill.
- F. Verify areas to be filled are not compromised with surface or ground water.

**3.02 PREPARATION**

- A. Scarify and proof roll subgrade surface to a depth of 8 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Prior to placement of aggregate base course material at paved areas, compact subsoil to 95 percent of its maximum dry density in accordance with ASTM D1557.
- E. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

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### 3.03 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
  - 1. Place fill soils compacted in horizontal lifts to a relative compaction of 90 percent or more in general accordance with ASTM D1557.
  - 2. Lift thickness for fill soils will vary depending on the type of compaction equipment used but should generally be placed in horizontal lifts not exceeding 8 inches in loose thickness.
  - 3. Place fill soils at slightly above optimum moisture content as evaluated by ASTM D1557.
  - 4. Avoid damage to wet and dry utility lines when compacting fill and subgrade materials.
- C. Employ a placement method that does not disturb or damage other work.
  - 1. Do not disturb or damage foundation perimeter drainage and foundation waterproofing and protective cover utilities in trenches.
- D. Systematically fill and compact per geotechnical report. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- H. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- I. Correct areas that are over-excavated.
  - 1. Load-bearing foundation surfaces: Fill with concrete.
  - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 90 or 95 percent of maximum dry density in subgrade zone.
- J. Compaction Density Unless Otherwise Specified or Indicated:
  - 1. Under paving and similar construction: 90 percent of maximum dry density.
  - 2. At upper 12 inches beneath vehicular pavements: 95 percent of maximum dry density.
  - 3. At other locations: At least 90 percent of maximum dry density.
- K. Reshape and re-compact fills subjected to vehicular traffic.
- L. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- M. Remove surplus fill and backfill materials from site.

### 3.04 FILL AT SPECIFIC LOCATIONS

- A. Use general fill unless otherwise specified or indicated.

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- B. Structural Fill:
  1. Use general fill.
  2. Fill up to subgrade elevations.
  3. Maximum depth per lift: 6 inches, compacted.
  4. Compact to minimum at least 90 percent of maximum dry density.
- C. At Footings:
  1. Use general fill.
  2. Fill up to subgrade elevation.
  3. Compact each lift to at least 90 percent of maximum dry density.
  4. Do not backfill against unsupported foundation walls.
  5. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- D. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
  1. Bedding: Use general fill.
  2. Cover with general fill.
  3. Fill up to subgrade elevation.
  4. Compact in maximum 8 inch lifts to at least 90 percent of maximum dry density. Compact to at least 95 percent in subgrade zone.
- E. At Planting Areas Other Than Lawns :
  1. Use general fill.
  2. Fill up to finish grade elevations.
  3. Compact to at least 90 percent of maximum dry density.
  4. See Section 31 22 00 for topsoil placement.
- F. Under Monolithic Paving :
  1. Compact subsoil to at least 90 percent of its maximum dry density before placing fill.
  2. Use general fill.
  3. Fill up to subgrade elevation.
  4. Compact to at least 90 percent of maximum dry density; , 95 percent in upper 12 inches.
  5. See Section 32 11 23 for aggregate base course placed over fill.

**3.05 TOLERANCES**

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1/2 inch from required elevations.

**3.06 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
  1. Laboratory Tests and Analyses: Where backfill is required to be compacted to a specified density, tests for compliance shall be made in accordance with requirements specified in

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Section 01 40 00 - Quality Requirements.

- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556 or ASTM D6938.
  - 1. Field inspections and testing shall be performed and submitted in accordance with requirements specified in Section 01 40 00 - Quality Requirements.
  - 2. Allow testing service to inspect and approve each subgrade and fill layer before further fill, backfill or construction Work is performed.
  - 3. Alternate Density Test Method:
    - a. Field density tests may also be performed by the nuclear method in accordance with ASTM D6938, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D1556/D1556M.
    - b. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D6938.
    - c. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of Work, on each different type of material encountered, and at intervals as directed by Architect or District's testing and inspection agency.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 1557 ("modified Proctor") or AASHTO T 180.
- D. Non-compliance: If tests indicate work does not meet specified requirements, remove work, replace and retest.
  - 1. Should tests of fill or backfill indicate non-compliance with required density, Contractor shall over-excavate, recompact and retest until specified density is obtained.
  - 2. Costs and Time associated with remedial Work and retesting shall be in accordance with provisions of the General Conditions.
  - 3. Retesting to demonstrate compliance shall be by a testing laboratory acceptable to District and shall be at Contractor's expense.
- E. Frequency of Tests:
  - 1. Footing Subgrade Testing:
    - a. For each strata of soil on which footings will be placed, perform at least one in-place density test to verify required design bearing capacities.
    - b. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata when acceptable to Geotechnical Engineer.
  - 2. Paved Areas and Building Slab Subgrade Testing:
    - a. Perform at least one field density test of subgrade for every 2,000 sf of paved area or building slab, but in no case fewer than three tests.
    - b. In each compacted fill layer, perform one field density test for every 2,000 sf of overlaying building slab or paved area, but in no case fewer than three tests.
  - 3. Foundation Wall Backfill Testing: Perform at least two field density tests at locations and elevations as directed.

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**3.07 CLEANING**

- A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

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**SECTION 32 11 23  
AGGREGATE BASE COURSES**

**1.01 SECTION INCLUDES**

- A. Aggregate base course.
- B. Paving aggregates.
- C. Soil sterilization.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 22 00 - Grading: Preparation of site for base course.
- B. Section 31 23 23 - Fill: Compacted fill under base course.
- C. Section 32 12 16 - Asphalt Paving: Finish and binder asphalt courses.
- D. Section 32 13 13 - Site Concrete: Finish concrete surface course.

**1.03 REFERENCE STANDARDS**

- A. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- B. SSPWC (Greenbook) - Standard Specifications for Public Works Construction.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Samples: 10 lb sample of each type of aggregate; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.
- D. Certificates of Conformance: Aggregate and sterilant materials.
- E. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- F. Compaction Density Test Reports.

**1.05 QUALITY ASSURANCE**

- A. Regulatory Requirements: Where reference is made to Standard Specifications, the following shall apply.
  - 1. Perform off-site Work in public rights-of-way in accordance with requirements of authorities having jurisdiction, including SSPWC (Greenbook). For conditions not indicated otherwise on Contract Drawings, conform to Standard Details adopted by authorities having jurisdiction.
  - 2. Perform on-site Work as indicated and referenced on Contract Drawings and as specified herein.
- B. The quantity of volatile organic compounds (VOC) used in weed killer, tack coat, primer and other materials shall not exceed limits permitted under current regulations of:
  - 1. Local Air Quality Management District (AQMD).

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- C. Source Quality Control: Obtain materials from one source throughout.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. When necessary, store materials on site in advance of need.
- B. When aggregate materials need to be stored on site, locate where directed by District.
- C. Aggregate Storage, General:
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Aggregate Type Class II: Coarse or crushed aggregate, conforming to Municipality, ASTM F588 Section 200-2.2.
- B. Coarse Aggregate: Pit run washed stone; free of shale, clay, friable material and debris.
  - 1. Graded in accordance with ASTM D2487 Group Symbol GW.
- C. Herbicide: Comply with all applicable environmental protection and hazardous materials laws and regulations .
  - 1. Comply with current EPA acceptable standard and the California Department of Pesticide Regulations for soils sterilant.
  - 2. Comply with the "Healthy Schools Act" as amended in 2014.
  - 3. Obtain product approval from District, prior to purchase and use.
  - 4. Sterilant: Commercial grade for commercial application.
    - a. Selected as appropriate for the environment in which is it to be placed.
  - 5. Contractor shall be licensed with the State of California to apply sterilant.
  - 6. Sterilant: Commercial grade for commercial application.
  - 7. Payment for soil sterilization: Include full compensation for application and all materials and incidental work required.
  - 8. Application Rate: Follow manufacturer recommendations.
  - 9. Acceptable Manufacturers:
    - a. Dow AgroSciences; Spike 80DF: [www.dowagro.com](http://www.dowagro.com).
    - b. Pro-Serve Inc.; Bare-Spot Monobor-Chlorate: [www.pro-serveinc.com](http://www.pro-serveinc.com).
    - c. Casoron 50W by Uniroyal Chemical Co., Inc.
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Geotextile Fabric: Non-biodegradable, non-woven, placed under base;

**2.02 SOURCE QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements for general requirements for testing and analysis of aggregate materials.

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- B. Where aggregate materials are specified using ASTM D2487 classification, testing of samples for compliance shall be provided before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

**2.03 EXAMINATION**

- A. Establishment of Grades
  - 1. Set grade stakes per Section 01 70 00 - Execution and Closeout Requirements.
  - 2. All work shall conform to the lines, elevations, and grades shown on the Drawings.
    - a. Use three consecutive points set on the same slope together so that any variation from a straight grade can be detected.
    - b. Report any such variation to the Architect. Contractor shall be responsible for any error in the grade of the finished work.
  - 3. Grade or location stakes lost or disturbed, shall be reset by the Surveyor at no additional expense to District.
  - 4. Areas having drainage gradients of 2 percent or more, provide elevation stakes, set with instrument, at grid intervals of 25 feet.
    - a. Intermediate stakes may be set by using a tightly-drawn string line over the tops of adjacent stakes.
    - b. Grade stakes must be set at all grade breaks, grade changes, etc.
  - 5. Areas having drainage gradients of less than 2 percent; provide elevation stakes, set with instrument, at 10 foot intervals.
    - a. Grade stakes must be set at all grade breaks, grade changes, etc.
- B. Verify that survey bench marks and intended elevations for the work are as indicated.
- C. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

**2.04 PREPARATION**

- A. Stockpiling:
  - 1. Clear and level storage sites prior to stockpiling of material.
  - 2. Stockpile all materials, including approved material available from excavation and grading, in the manner and at the locations designated.
  - 3. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Construction Manager to prevent segregation.
  - 4. Materials obtained from different sources shall be stockpiled separately.
- B. Soil Sterilant:
  - 1. Sterilize soil areas to receive paving.
  - 2. Apply soil sterilant in accordance with manufacturer's instructions and applicable environmental regulations.
  - 3. Take care to confine application to the areas to be paved. Sterilant shall not be applied within 2 feet of planting areas.

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- C. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- D. Do not place aggregate on soft, muddy, or frozen surfaces.
- E. Place and compact aggregate base material in accordance with SSPWC (Greenbook), Subsection 301-2. Place aggregate base below curbs and gutters and paving also, compacted to 95 percent at vehicular traffic and 90 percent at pedestrian-only traffic.
- F. Application of Base Course:
  - 1. After preparing the subgrade, Avoid all vehicular or machine traffic on the subgrade.
    - a. Should it be necessary to haul over the prepared subgrade, drag and roll the traveled way as frequently as may be necessary to remove ruts, cuts, and breaks in the surface.
    - b. Rake and hand tamp all cuts, ruts, and breaks in the surface of the subgrade that are not removed by the above operations.
    - c. Equip with pneumatic tires all equipment used for transporting materials over the prepared subgrade.
  - 2. Do not permit continued use of sections of prepared subgrade for hauling, so as to cut up or deform it from the true cross-section. Protect the prepared subgrade from all traffic.
  - 3. Maintain the surface in its finished condition until the succeeding layer is placed.
- G. Under Bituminous Concrete Paving:
  - 1. It is required that areas of exterior asphalt pavement be underlain by a layer of aggregate base material which meets the requirements, Thickness of base layer is as shown on the Drawings and varies per the Usage Type area.
    - a. It is required that the upper 12 inches of soils below asphalt pavement base material be over-excavated and consist predominantly of satisfactory soil materials and/or approved imported fill.
      - 1) Engineered Fill: See Section 31 23 23 - Fill.
    - b. It is required that the exposed bottom surface soils, below overexcavation, be scarified to the recommended depth of 8 inches, moisture conditioned to achieve optimum moisture content, but not higher than 2 percent above optimum, and then re-compacted to a minimum 90 percent relative compaction before any fill materials are placed.
  - 2. The above subgrade preparation recommendations are based on the assumption that soils encountered during field exploration are representative of soils throughout the site.
    - a. However, there can be unforeseen and unanticipated variations in soils between points of subsurface exploration. For this reason, the actual subgrade preparation will have to be determined on the basis of in-grading observations and testing performed by representatives of the project geotechnical consultant.
  - 3. Provide grade stakes and elevations by a California Licensed Surveyor (LS) for the Geotechnical Engineer.
    - a. Verify that the over-excavation depths, shown on the construction drawings for asphalt concrete pavement structural sections, have been achieved prior to re-compaction.

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4. Correct irregularities by dressing down or filling as may be required, to bring areas to true subgrade elevations.
  5. Where filling is required, scarify the subgrade to bond the new material to the in place material; use additional material as required at no additional cost. Subject to the approval of the Architect.
  6. Remove excess material from the site to a legal disposal area.
- H. Under Portland Cement Concrete Paving:
1. Compact to 95 percent of maximum dry density and 90 percent at pedestrian-only traffic.
  - I. Place aggregate in maximum 4 inch layers and roller compact to specified density.
  - J. Level and contour surfaces to elevations and gradients indicated.
  - K. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
  - L. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
  - M. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
  - N. Apply herbicide to finished surface.

**2.05 TOLERANCES**

- A. Subgrade Tolerances:
1. Subgrade for Pavement: Do not vary more than 0.02 ft..
  2. Subgrade for Subbase or Base Material: Do not vary more than 0.04 ft..
  3. Variations within the above specified tolerances shall be compensating so that the average grade and cross section specified are met.
- B. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- C. Scheduled Compacted Thickness: Within 1/4 inch.
- D. Variation From Design Elevation: Within 1/2 inch.

**2.06 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements for general requirements for field inspection and testing.
- B. Compaction density testing shall be performed on compacted aggregate base course in accordance with ASTM D1556 or ASTM D6938.
- C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Proof roll compacted aggregate at surfaces that are under slabs-on-grade and paving.

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**2.07 CLEANING**

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

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**SECTION 32 12 16  
ASPHALT PAVING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Single course bituminous concrete paving.
- B. Double course bituminous concrete paving.
- C. Surface sealer.
- D. This section compliments and shall be coordinated with Civil Drawing specifications / requirements. The most stringent requirements shall be utilized.
- E. Asphaltic concrete paving for vehicular traffic and curbs, including necessary patching and repair of damaged new and existing paving.
- F. Patching and repair of existing asphaltic concrete paving for previous damage, for underground utility work and where damaged by new construction.
  - 1. Bituminous Surfacing Repair: Areas removed for utility trenches, heaved by tree roots, cracked areas, protruding areas where pavement meets hard surfaces, depressed areas, and raveled bituminous pavement.
  - 2. Areas heaved by tree roots, cracked areas, holes, and trenches.

**1.02 RELATED REQUIREMENTS**

- A. Section 02 41 00 - Demolition: Selective demolition, site demolition, structure removal.
- B. Section 31 22 00 - Grading: Preparation of site for paving and base.
- C. Section 31 23 23 - Fill: Compacted subgrade for paving.
- D. Section 32 11 23 - Aggregate Base Courses: Aggregate base course.
- E. Section 32 13 13 - Site Concrete: Concrete curbs.
- F. Section 32 17 23 - Pavement Markings.

**1.03 REFERENCE STANDARDS**

- A. AI MS-19 - Basic Asphalt Emulsion Manual.
- B. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
- C. SSPWC (Greenbook) - Standard Specifications for Public Works Construction.

**1.04 SUBMITTALS**

- A. Materials List: List source and quality standard for all asphaltic concrete materials.
- B. Mix Design:
  - 1. Formulate a job-mix formula using the Hveem method in accordance with SSPWC (Greenbook) Section 203-6.2 and submit for approval.

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2. Submit designs for asphaltic concrete prepared by a materials laboratory under direct supervision of a Civil Engineer licensed in the State of California or a standard mix design proven in actual performance.
  3. Resultant Mixture: Hveem properties conforming to SSPWC (Greenbook) Section 203-6.4.3.
- C. Certifications:
1. Weighmaster's Certificates or certified delivery tickets for each truckload of bituminous material delivered to site.
  2. Certificates of Conformance: Asphalt, aggregate and sterilant materials.
    - a. 20 days prior to the delivery of aggregates, asphalt materials, and paving mixes to the project site, submit certificates and test results of compliance of such materials with these specifications.
    - b. Submit certificates of compliance from the supplier for bituminous materials for paint binder, asphaltic concrete, and seal coat.
    - c. Submit weigh master's certificates or certified delivery tickets for each truck load of asphaltic material delivered to the project site.
    - d. Upon completion of the weed control treatment, and as a condition for final acceptance, furnish a written certificate stating the brand name of the sterilant and the manufacturer, and that the sterilant used had at least the minimum required concentration, and that the rate and method of application complied in every respect with the conditions and standards contained herein.
- D. Samples:
1. Prior to the delivery of specified aggregate to the site, submit samples of the material for the Inspector's acceptance in accordance with SSPWC (Greenbook) Section 4-1.4. Samples shall be typical of materials to be furnished from the proposed source and in conformance with the specified requirements.
  2. Provide aggregate base gradation and quality certifications, dated within 30 days of submittal.

**1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with locally adopted {\rs\#1}.
- B. Mixing Plant: Conform to Locally adopted ASTM F588.
  1. Asphaltic Concrete Producers Qualifications: Use only materials furnished by a bulk asphaltic concrete producer regularly engaged in production of hot mix, hot laid bituminous concrete.
  2. Applicator Qualifications: Paving machine and roller operators shall be fully trained and experienced in the installation of asphaltic concrete paving on projects of similar size and complexity.
- C. Testing and analysis of granular base material and asphaltic concrete paving mix shall be performed under provisions of Division 01.
- D. Obtain materials from same source throughout.

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**1.06 FIELD CONDITIONS**

- A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen; or when rain is imminent.
  - 1. Tack Coats: Minimum surface temperature of 60 deg F.
  - 2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
  - 3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.
- B. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

- A. Comply with applicable code for paving work on public property.
- B. Where reference is made to SSPWC (Greenbook), the following shall apply.
  - 1. For conditions not indicated otherwise on Contract Drawings, conform to Standard Details adopted by authorities having jurisdiction, including Standard Details for Public Works Construction, as amended and adopted by those authorities.
  - 2. Perform on-site Work as indicated and referenced on Contract Drawings and as specified herein.
- C. The quantity of volatile organic compounds (VOC) used in weed killer, seal coat, tack coat, primer, and other materials shall not exceed limits permitted under current regulations of local Air Quality Management District (AQMD).

**2.02 MATERIALS**

- A. General: Aggregate base, prime coat paint binder, bituminous surface course and other materials shall be as noted on the Contract Drawings and shall comply with requirements of authorities having jurisdiction.
- B. Asphalt Cement: ASTM D 946.
- C. Asphalt Concrete Materials: SSPWC (Greenbook), Subsection 203-6.
- D. Aggregate for Base Course: See Section 32 11 23 - Aggregate Base Course.
- E. Aggregate for Binder Course : Angular crushed washed stone; free of shale, clay, friable material and debris.
  - 1. Graded in accordance with ASTM D2487 Group Symbol GW.
- F. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.
- G. Geotextile Fabric: Non-biodegradable, non-woven Petromat Enviro manufactured by Propex Operating Company, LLC.
  - 1. Geotextile Construction: Needle-punched nonwoven geotextile composed of 100% polypropylene or polypropylene / recycled polyester blend, staple fiber and heat calendered on one side.

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- H. Crack Filler:
  - 1. Cracks less than 1/2 inch in width: GuardTop Crackfiller or equal.
  - 2. Cracks 1/2 inch or greater in width: #4 Sheet mix asphalt.
- I. Primer: In accordance with locally adopted {\rs\#1}.
- J. Tack Coat: Homogeneous, medium curing, liquid asphalt.
- K. Seal Coat: AI MS-19, slurry type.
  - 1. Asphalt Emulsion, www.aema.org, SS1-h, per SSPWC (Greenbook) Section 203-9.
  - 2. Acceptable Manufacturers:
    - a. Blue Diamond Asphalt; Satin Seal: www.bluediamondasphalt.com.
    - b. Diversified Asphalt Product; Over Kote: www.diversifiedasphalt.com.
    - c. Gold Star Asphalt Products: goldstarsphalt.com
    - d. SealMaster Pavement Products & Equipment; MasterSeal: sealmaster.net.
    - e. Vulcan Materials Company; GuardTop: www.vulcanmaterials.com.
    - f. Western Colloid Products; Park Top: www.westerncolloid.com.
    - g. Substitutions: See Section 01 60 00 - Product Requirements.

**2.03 ASPHALT PAVING MIXES AND MIX DESIGN**

- A. Asphalt Surfacing Materials: Provide asphalt surfacing meeting the following requirement, furnished from a commercial asphalt central mixing plant.
- B. Use dry material to avoid foaming. Mix uniformly.
- C. Base Course: 4.5 to 5.8 percent of asphalt cement by weight in mixture in accordance with ASTM F588 Section 203-6.4.3, Type B.
- D. Binder Course: 4.5 to 6 percent of asphalt cement by weight in mixture in accordance with AI MS-2.
  - 1. CSS-1 h and conform to the requirements of SSPWC (Greenbook), Section 203-3 Emulsified Asphalt.
- E. Parking Lot Wearing Course: 4.6 to 6.0 percent of asphalt cement by weight in mixture in accordance with {\rs\#1} Section 203-6.4.3, Type C2.
  - 1. Provide at least two courses of asphalt when Type C2 asphalt pavement is greater than 3 inches.
  - 2. Surface Course Minimum Thickness: 1 inch and a maximum of 2 inches.
- F. Submit proposed mix design of each class of mix for review prior to beginning of work.

**2.04 SOURCE QUALITY CONTROL**

- A. Test mix design and samples in accordance with AI MS-2.
- B. Submit asphaltic concrete mix design proposed by the Contractor to the Engineer for review.
- C. Proposed mix to be tested for conformance with the specifications, including grading, asphalt content and stability.

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## 2.05 ACCESSORIES

- A. Headers and Stakes:
  - 1. 2 x 6 inch nominal Redwood, Construction Heart Grade, or preservative treated douglas fir (PTDF), except at curves provide laminated 1 x 6 inch nominal PTDF., unless indicated otherwise on Drawings
  - 2. Stakes: 2 x 4 x 18 inch long Redwood, or 2 x 3 x 18 inch long PTDF; at 48 inch on center maximum.
  - 3. Nails: Common, use hot dipped galvanized only, 12d minimum.
- B. Pavement Reinforcing Fabric: Non-woven polypropylene fabric conforming to SSPWC (Greenbook), Subsection 213-1.
  - 1. Basis of Design Product: Petromat as manufactured by Propex Fabrics inc.; [www.geotextile.com](http://www.geotextile.com), or approved equal.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that compacted subgrade and granular base is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Fine grading, checking, shaping, and compacting of subgrade shall be complete before start of asphaltic concrete Work.
- D. Soil Sterilant: Sterilize soil areas to receive asphaltic concrete paving. Apply soil sterilant in accordance with manufacturer's instructions and applicable environmental regulations. Take care to confine application to the areas to be paved. See Section 32 11 23 - Aggregate Base Courses for product information.
- E. Curbs and Gutters: Gutters shall be in place and cured prior to start of asphaltic concrete Work. Provide lumber ramping at all locations where rolling equipment or vehicles cross new concrete paving, curbs and gutters.
- F. Headers: Place headers with tops flush with finish asphaltic concrete surfaces. Back headers with stakes.
  - 1. Install headers along edge of bituminous surfacing abutting turf, earth, or planting area, unless indicated otherwise.
  - 2. Install headers so the bottom surface has continuous bearing on solid grade. Where excavation for headers is undercut, thoroughly tamp soil under the header. Compact backfill on both sides of header to the density of adjacent undisturbed earth.
  - 3. Fasten headers in place with redwood or Douglas fir stakes of length necessary to extend into solid grade a minimum of 12 inches. Stakes shall be of sound material, neatly pointed, driven vertically, and securely nailed to headers. Space stakes, not to exceed 4 feet on centers with top of stakes set one inch below top of header. Provide a minimum of 2-12d galvanized common nails through each stake.
  - 4. Remove existing headers where new surfacing is installed adjacent to existing surfacing.

- 5. Install temporary headers at transverse joints of paving where continuous paving operations are not maintained.
- 6. Provide additional stakes and anchorage as required to fasten headers in place
- G. Do not place asphalt concrete on any surface, which contains ponded water or excessive moisture in the opinion of the Architect or consulting engineer.
  - 1. If paving operations are in progress and rain or fog forces a shut down, loaded trucks in transit shall return to the plant, and no compensation will be allowed therefore.
  - 2. Provide canvas tarpaulins to cover all loads of asphalt from the time that the mixture is loaded until it is discharged from the delivery vehicle, unless otherwise directed in writing.

**3.02 PAVEMENT REPAIR REMOVAL**

- A. Remove bituminous and concrete pavement in accordance with applicable provisions of SSPWC (Greenbook) Section 300 - Earthwork.
- B. Pavement Heaved By Roots:
  - 1. Remove pavement to limits of distortion and expose roots.
  - 2. Trim roots to provide at least 12 inch clearance to pavement.
- C. Remove protruding bituminous surfaces flush with the surrounding grade using a suitable tool or equipment so that adjacent finishes are not blackened.
- D. Remove raveled and depressed bituminous pavement to limits indicated or required.
- E. Saw cut existing improvements, trim holes and trenches in bituminous and concrete pavement to permit mechanical hand tampers to compact the fill.
- F. Remove broken concrete by saw cutting. If the required cut line is within 30 inches of a score or joint line or edge, cut and remove to the score, joint line, or edge.

**3.03 EXCAVATING, BACKFILLING AND COMPACTING FOR REPAIR**

- A. Conform to requirements in Section 31 23 16 - Excavation or 31 23 23 - Fill, as required.
- B. Where subgrade or base is deemed to be unstable or otherwise unsuitable, excavate such materials to firm earth, and replace with a required material. Install and compact fill materials in accordance with the requirements of related Specification sections.

**3.04 HEADERS**

- A. Install headers along edge of bituminous surfacing abutting turf, earth, or planting area, unless indicated otherwise.
- B. Install headers so the bottom surface has continuous bearing on solid grade.
  - 1. Where excavation for headers is undercut, thoroughly tamp soil under the header.
  - 2. Compact backfill on both sides of header to the density of the adjacent undisturbed grade.
- C. Fasten headers in place with redwood or Douglas fir stakes of length necessary to extend into solid earth a minimum of 12 inches.
  - 1. Stakes shall be of sound material, neatly pointed, driven vertically, and securely nailed to headers.

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- 2. Space stakes, not to exceed 4 feet on centers with top of stakes set one inch below top of header.
- 3. Provide a minimum of two 12d galvanized common nails through each stake.
- D. Remove existing headers where new surfacing is installed adjacent to existing surfacing.
- E. Install temporary headers at transverse joints of paving where continuous paving operations are not maintained.
- F. Provide additional stakes and devices as required to fasten headers.

**3.05 RESURFACING**

- A. Holes and Trenches:
  - 1. Remove loose dirt and backfill with cement-sand slurry allowing for surfacing one inch thicker than existing.
  - 2. Resurface flush with existing adjoining pavement installing the same type of materials and section provided in existing improvements.
- B. Other Areas:
  - 1. Other surface improvements damaged or removed shall be cut to a neat even line and excavated one inch below the bottom of the existing pavement.
  - 2. Resurface by following the original grades and installing the same type of materials provided in existing improvements.
- C. Where bituminous surfacing abuts concrete, masonry, walks or paving, tamp joint smooth, if necessary, as described above to obtain a uniformly even joint, true to line and grade. Tamp and smooth materials before asphalt cools.

**3.06 AGGREGATE BASE COURSE**

- A. See Section 32 11 23.
- B. Unless otherwise indicated, base course shall be crushed aggregate base, fine grade, 3 inches thick or equal to thickness of the existing base, whichever is greater.
- C. Inspector will examine the base before the paving has begun. Correct any deficiencies before the paving is started.
- D. Wherever asphaltic pavement does not terminate against a curb, gutter, or another pavement, provide and install a redwood or pressure treated Douglas fir header at the line of termination.

**3.07 PREPARATION - PRIMER**

- A. Apply primer in accordance with manufacturer's instructions.
- B. Apply primer on aggregate base or subbase at uniform rate of 0.25 gal/sq yd.
- C. Apply primer to contact surfaces of curbs, gutters.
- D. Use clean sand to blot excess primer.

**3.08 PREPARATION - TACK COAT**

- A. Apply tack coat in accordance with ASTM F588 Section 302-5.4.

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- B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 0.10 gal/sq yd.
- C. Apply tack coat to contact surfaces of curbs, gutters and previously placed or existing paving.
- D. Joining Pavement: Expose, cut and clean edges of existing pavement to straight, vertical surfaces for full depth of existing pavement.
  - 1. Paint edge with asphalt emulsion before placing new asphaltic concrete.
  - 2. Joints in New Paving: In accordance with SSPWC (Greenbook).

**3.09 PLACING ASPHALT PAVEMENT - SINGLE COURSE**

- A. Install Work in accordance with Subsection 302-5.
- B. Asphalt concrete of the class indicated in Part 2 shall be laid in courses conforming to SSPWC (Greenbook) Table 302-5.5(A), unless otherwise stated herein.
- C. Place asphalt within 24 hours of applying primer or tack coat.
- D. Place thickness as indicated on Civil Drawings to minimum 1 inch compacted thickness.
  - 1. Asphalt concrete work shall include full depth patching and variable thick asphalt concrete transition areas.
  - 2. Provide daily the Inspector, with copies of certificates of weight for all materials delivered to the job site and/or incorporated in the work.
  - 3. At no time shall the coarse aggregate that has segregated from the mix be scattered across the paved mat.
- E. Install gutter drainage grilles and frames and manhole frames in correct position and elevation.
- F. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position.
  - 1. Compact (roll) asphaltic concrete in accordance with SSPWC (Greenbook), Subsection 302-5.6, using machine rollers.
    - a. Compaction by vehicular traffic is prohibited.
    - b. Compact areas inaccessible to rolling equipment with machine-powered tamper.
- G. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

**3.10 PLACING ASPHALT PAVEMENT - DOUBLE COURSE**

- A. Provide at least two courses of asphalt when Type D2 asphalt pavement is greater than 1-1/2 inches. The surface course shall be a minimum thickness of 1 inch and a maximum of 1-1/2 inches.
- B. Provide at least two courses of asphalt when Type C2 asphalt pavement is greater than 3 inches. The surface course shall be a minimum thickness of 1 inch and a maximum of 2 inches.
- C. Install Work in accordance with ASTM F588 Subsection 302-5.
- D. Place asphalt binder course within 24 hours of applying primer or tack coat.
- E. Place binder course to thickness as indicated on Civil Drawings, minimum 1 inch compacted thickness.

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- F. Place asphalt wearing course within two hours of placing and compacting binder course.
- G. Place wearing course to thickness as indicated on Civil Drawings, minimum 1 inch compacted thickness.
- H. Install gutter drainage grilles and frames and manhole frames in correct position and elevation.
- I. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position.
  - 1. Compact (roll) asphaltic concrete in accordance with SSPWC (Greenbook), Subsection 302-5.6, using machine rollers.
    - a. Compaction by vehicular traffic is prohibited.
    - b. Compact areas inaccessible to rolling equipment with machine-powered tamper.
- J. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

**3.11 SEAL COAT**

- A. Apply seal coat after surface course application, in accordance with manufacturer's recommendations.
- B. Apply seal coat to surface course and asphalt curbs in accordance with § 302-8.2.
- C. Add water to specified seal coat material. When air temperatures of 90 degrees F or more are encountered during application, consult manufacturer for recommendations.
- D. If pavement surface exhibits imperfections of roller marks, rock pockets, ridges or depressions as determined by the Architect, the addition of sand aggregate to seal coat, and amounts thereof, shall be as recommended by the manufacturer.
- E. A second application shall be made after first coat has dried to the touch. When sand is added to the first seal coat, two additional coats without extra sand shall be applied.
- F. Allow seal coat to dry before permitting traffic or striping.

**3.12 PAVEMENT REPAIR AND PAVING**

- A. Preparation of existing pavement: Where indicated, remove loose asphaltic concrete, cleanout "pot holes" and cracks, remove dirt, oil and other foreign materials.
- B. Repair holes with full paving section as specified. Repair "alligating" with asphalt "skin-patch". Fill all cracks larger than 1/4 inch wide with asphalt emulsion slurry.
- C. Repair of Existing Surfacing:
  - 1. Fill cracks 1/2 inch wide and less with RS-1 emulsion and silica sand or other required material.
  - 2. Cracks larger than 1/2 inch wide shall be filled with Type C2 Asphalt Concrete as specified.
    - a. Cracks shall be filled to the level of adjacent surfacing.
  - 3. Where low areas, holes, or depressions occur in existing surfacing, repair with emulsified asphalt.

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- a. Install material, strike off the emulsified asphalt with a straightedge flush with adjoining surfacing.
  - b. Finish with a steel trowel, and after dehydration, compact by rolling or tamping.
- D. Tack Coat: Apply asphalt oil AR-4000 or AR-8000, as required for jobsite condition, at metered application rate of no less than a range from 0.2 to 0.3 gallons per square yard of fabric or as directed by manufacturer and to provide 100 percent fabric saturation and ample bonding for paving section.
- E. Fabric Reinforcement: Place fabric smooth side up in tack coat with 2 to 4 inch overlap. Hand-broom to remove wrinkles. Apply addition tack coat to joints and between overlapped fabric layers.
- F. Overlay Asphalt: Place single course asphalt, 1-1/2 inch compacted thickness, in conformance with specified standards in this section.

**3.13 TOLERANCES**

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.
- C. Variation from True Elevation: Within 1/2 inch.

**3.14 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for quality control.
- B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.
  - 1. Flood test entire area in presence of the Project Inspector.
  - 2. Entire area tested to be free of standing water or puddles.
- C. Pavement at all longitudinal joints shall have a Field Density of 95%, as described in SSPWC (Greenbook), Section 302-5.6.2.
  - 1. When the test results of the field cores are less than 95% Relative Compaction, remove a 1 foot wide section on each side of the longitudinal joint.
  - 2. Replace the removed pavement with an asphalt mix that meets the job specification at no additional cost to the District.
- D. Test: Flood test all paving to demonstrate positive drainage.
  - 1. Before acceptance, water test all pavements to ensure proper drainage as directed by the Inspector.
  - 2. Flooding Method: By water tank truck.
  - 3. Fill depressions where the water ponds to a depth of more than 1/8 inch; or the slope corrected to provide proper drainage.
  - 4. The edges of the fill shall be feathered and smoothed so that the joint between the fill and the original surface is invisible.
  - 5. No standing water shall remain 1-hour after test.

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**3.15 PROTECTION**

- A. Immediately after placement, protect pavement from mechanical injury for 2 days or until surface temperature is less than 140 degrees F.
  - 1. After final rolling, prohibit all traffic on asphaltic concrete until mix has fully cooled and set. Minimum time, in all cases shall be 6 hours.

**3.16 CLEANING**

- A. After completion of paving operations, clean all existing and new improvements that have been soiled, especially by oil tracking from asphalt tanks or placement in general.
- B. For Substantial Completion review, broom clean and wash paving with hoses. Clean residue from landscaping installation.

**END OF SECTION**

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**SECTION 32 13 13  
SITE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete sidewalks, integral curbs, gutters, parking areas, and general site applications.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories.
- B. Section 07 92 00 - Joint Sealants: Sealing joints.
- C. Section 31 22 00 - Grading: Preparation of site for paving.
- D. Section 31 23 23 - Fill: Compacted subbase for paving.
- E. Section 32 11 23 - Aggregate Base Courses: Gravel base course.
- F. Section 32 17 23 - Pavement Markings.

**1.03 REFERENCE STANDARDS**

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- B. ACI 301 - Specifications for Structural Concrete.
- C. ACI 305R - Guide to Hot Weather Concreting.
- D. ACI 306R - Guide to Cold Weather Concreting.
- E. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- F. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- G. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- H. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
- I. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
- J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
- L. ASTM C150/C150M - Standard Specification for Portland Cement.
- M. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- N. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
- O. SSPWC (Greenbook) - Standard Specifications for Public Works Construction.

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**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.

**1.05 QUALITY ASSURANCE**

- A. Lines and Levels: Established by State of California licensed Surveyor or registered Civil Engineer. Costs of surveying services shall be included in the Contract Sum.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.

**PART 2 PRODUCTS**

**2.01 PAVING ASSEMBLIES**

- A. Comply with applicable requirements of ACI 301.
- B. Concrete Sidewalks: 4,000 psi 28 day concrete, thickness as indicated on Drawings, minimum 4 inches, natural grey color Portland cement.

**2.02 REGULATORY REQUIREMENTS:**

- A. Conform to California Code of Regulations (CCR), Volume 2, Part 2, Chapters 18A and 19A.
- B. Conform to California Building Code (CBC), Chapter 11B and ADA Standards for accessibility requirements.
  - 1. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Sections 11B-302 and 11B-403.
  - 2. Concrete paving and concrete finishes along accessible routes of travel shall be at least as slip-resistant as that described as a medium salted finish for slopes of less than 6%, and slip resistant at slopes of 6% or greater; CBC 11B-403.2.
  - 3. Accessible routes of travel, walks, paving, and sidewalks, shall have a continuous common surface with minimum width of 48 inches per CBC 11B-403.5.1, not interrupted by steps or by abrupt changes in level.
    - a. CBC 11B-303.2 Vertical: Changes in level exceeding 1/4 inch high maximum shall be permitted to be vertical and without edge treatment.
    - b. CBC 11B-303.3 Beveled: Changes in level between 1/4 inch high minimum and 1/2 inch high maximum shall be beveled with a slope not steeper than 1:2.
  - 4. Surface cross slopes shall not exceed 2 percent on any accessible path of travel.
- C. Albedo Reflectance of Finish Concrete: 0.30, minimum.

**2.03 FORM MATERIALS**

- A. Form Materials: As specified in Section 03 10 00, comply with ACI 301.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
  - 1. Thickness: 1/2 inch.

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#### 2.04 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength; deformed billet steel bars; unfinished.
- B. Dowels: ASTM A615/A615M, Grade 60 - 60,000 psi yield strength; deformed billet steel bars; unfinished finish.
- C. Provide supports for reinforcement to position the bars at mid depth of the concrete. Plastic and/or steel chairs, and dobies are acceptable.

#### 2.05 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Cement: ASTM C150/C150M, Sulfate Resistant - Type V Portland cement, gray color.
- C. Fine and Coarse Mix Aggregates: ASTM C33/C33M.
- D. Water: Clean, and not detrimental to concrete.
- E. Chemical Admixtures: ASTM C494/C494M, Type A - Water Reducing, Type C - Accelerating, and Type G - Water Reducing, High Range and Retarding.
  - 1. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

#### 2.06 ACCESSORIES

- A. Curing Compound: ASTM C309, Type 1-D, Class A.
  - 1. Comply with all applicable air pollution requirements.
- B. Liquid Surface Sealer: <>
  - 1. Penetrating High solids, acrylic curing and sealing compound: Minimum 25% non-yellowing, acrylic solids curing compound; shall conform to ASTM C309 and/or ASTM C1315, Type I, Class A, VOC compliant.
    - a. Products:
      - 1) Laticrete International, Inc.; L&M Aquapel Plus: [www.lmcc.com](http://www.lmcc.com).
      - 2) L.M. Scofield Company (Sika Brand); Cureseal-W: [www.scofield.com](http://www.scofield.com).
      - 3) W. R. Meadows Company; Intraguard: [www.wrmeadows.com](http://www.wrmeadows.com).
      - 4) Substitutions: See Section 01 6000 - Product Requirements.
- C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
  - 1. Material: Closed-cell, non-absorbent, compressible polymer foam in sheet form.

#### 2.07 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

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D. Concrete Properties:

1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; As scheduled.
2. Water-Cement Ratio: Maximum 40 percent by weight, or according to indicated concrete strength..
3. Maximum Slump: 4 inches.

**2.08 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

**3.02 SUBBASE**

- A. See Section 32 11 23 for construction of base course for work of this Section, where indicated on Drawings.

**3.03 PREPARATION**

- A. Project Conditions:
1. Water and Dust Control: Maintain control of concrete dust and water at all times. Do not allow adjacent planting areas to be contaminated.
- B. Moisten base to minimize absorption of water from fresh concrete.
- C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

**3.04 COORDINATION WITH EXISTING CONSTRUCTION**

- A. Connection to Existing Construction: Where new concrete is doweled to existing construction, drill holes in existing concrete, insert steel dowels and pack with non-shrinking grout.
- B. Preparation of Existing Concrete: Prepare previously placed concrete by cleaning with steel brush and apply bonding agent in accordance with manufacturer's instructions.

**3.05 FORMING**

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

**3.06 REINFORCEMENT**

- A. Place reinforcement at midheight of slabs-on-grade.
1. Locate reinforcement to provide required cover by concrete. If not otherwise indicated on Drawings, provide concrete cover in compliance with ACI 318.

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2. Reinforcement Spacing: Space reinforcement as indicated on Drawings or in Standard Specifications, whichever is more stringent. If not indicated, maintain clear spacing of two times bar diameter but not less than 1-1/2 inch nor less than 1-1/3 times maximum size aggregate.
  3. Reinforcement Supports: Provide load bearing pads under supports or provide precast concrete block bar supports.
- B. Interrupt reinforcement at contraction and expansion joints.
  - C. Place dowels to achieve pavement and curb alignment as detailed.
    1. Secure tie dowels in place before depositing concrete.
    2. Provide No. 3 bars, 18 inch long at 24 inches O.C. for securing dowels where no other reinforcement is provided.

**3.07 COLD AND HOT WEATHER CONCRETING**

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

**3.08 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
  1. Mixing: If batch plant is within travel time not exceeding maximum limits, transit mix concrete in accordance with ASTM C94/C94M. If travel time exceeds limits, provide alternative means for mixing and submit for review and approval.
- B. Do not place concrete when base surface is wet.
- C. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- D. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- E. Place concrete to pattern indicated.

**3.09 JOINTS**

- A. Align curb, gutter, and sidewalk joints.
- B. Place 1/2 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
  1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
  2. Secure to resist movement by wet concrete.
  3. If expansion joints are not indicated, conform to SSPWC (Greenbook) and standard details and specifications of authorities having jurisdiction.
- C. Provide scored joints.
  1. Tooled Joints: 1-inch deep by 3/16-inch wide tooled joints with 1/8-inch radius corners.

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2. At 5 feet intervals for pedestrian paving.
  3. At 10 feet intervals for vehicle paving.
  4. Between sidewalks and curbs.
  5. Between curbs and pavement.
- D. Provide keyed joints as indicated.
- E. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

### 3.10 FINISHING

- A. Area Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Medium broom, texture perpendicular to pavement direction with troweled and radiused edge.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.
- D. Place sealer on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

### 3.11 TOLERANCES

- A. ACI 301, Class B, except paving in public rights-of-way shall conform to SSPWC (Greenbook).
- B. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- C. Maximum Variation From True Position: 1/4 inch.
- D. Control-joint grooves and other conspicuous lines:
1. 1/4 inch maximum in any 20 feet.
  2. 1/2 inch maximum in any 40 feet.
- E. Variation in Cross-Sectional Thickness of Slabs:
1. Minus 1/4 inch.
  2. Plus 1/2 inch.
- F. Variation in Radii
1. In radii of less than 10 feet:
    - a. 1/8 inch in any 5 feet.
    - b. 1/4 inch in any 10 feet.
  2. In radii of 20 feet:
    - a. 1/4 inch in any 10 feet.
    - b. 3/8 inch in any 20 feet
  3. In radii of 30 feet or more:
    - a. 1/2 inch in any 20 feet.
    - b. 1 inch in any 30 feet.
- G. Coefficient of Friction for Finish Surface:
1. Pedestrian Vehicular Finish Surface: Minimum 0.6 static coefficient of friction is required for all concrete paving finish surface. All concrete paving surfaces to be broom finish.

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2. Ramps: Minimum 0.8 static coefficient of friction is required for all concrete paving finish surfaces on ramps. All concrete paving surfaces on ramps to be broom finish.

**3.12 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
  1. Provide free access to concrete operations at project site and cooperate with appointed firm.
  2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
  3. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 75 cu yd or less of each class of concrete placed.
  1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
  2. Perform one slump test for each set of test cylinders taken.
- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

**3.13 PROTECTION**

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
  1. Provide lumber ramping and plywood covering where curbs and gutters are subject to vehicular and equipment traffic during construction.

**END OF SECTION**

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**SECTION 32 17 23  
PAVEMENT MARKINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Painted pavement markings.
  - 1. Accessible Parking Spaces.

**1.02 RELATED REQUIREMENTS**

- A. Section 32 12 16 - Asphalt Paving.
- B. Section 32 13 13 - Site Concrete.
- C. Section 32 17 26 - Tactile Warning Surfacing.

**1.03 REFERENCE STANDARDS**

- A. AASHTO M 247 - Standard Specification for Glass Beads Used in Pavement Markings.
- B. AASHTO MP 24 - Standard Specification for Waterborne White and Yellow Traffic Paints.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- D. CBC Ch. 11B - California Building Code-Chapter 11B.
- E. FS TT-B-1325 - Beads (Glass Spheres); Retro-Reflective.
- F. FS TT-P-1952 - Paint, Traffic and Airfield Marking, Waterborne.
- G. SCAQMD 1113 - Architectural Coatings.
- H. SSPWC (Greenbook) - Standard Specifications for Public Works Construction.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate the work of this section with adjoining work.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by affected installers.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Certificates: Submit for each batch stating compliance with specified requirements.
  - 1. Painted pavement markings.
- D. Manufacturer's Instructions:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- E. Manufacturer's qualification statement.

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- F. Installer's qualification statement.
- G. Maintenance Materials: Furnish the following for District's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements for additional provisions.
  - 2. Extra Paint: 2 containers, 1 gallon size, of each type and color.
  - 3. Extra Markers: 5 percent, of each type and color.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver paint in containers of at least 2 gallons accompanied by batch certificate.
- B. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment, accompanied by batch certificate.
- C. Store products in manufacturer's unopened packaging until ready for installation.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**1.08 FIELD CONDITIONS**

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.
  - 1. Do not apply marking paint when weather is foggy or rainy, or when such conditions are anticipated within eight hours of application.
  - 2. Do not apply marking paint when wind velocity causes uncontrollable overspray or excessively rapid drying.
- C. Sequence and Schedule: Apply pavement markings after asphaltic concrete and portland cement concrete and interlocking concrete paving Work are complete and properly cured and, if applicable, sealer has been applied to asphaltic concrete and landscaping Work is complete.
  - 1. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.

**1.09 SEQUENCING**

- A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of markings.

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**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS:**

- A. Comply with CalGreen requirements.
  - 1. Comply at time of installation with Air Quality standards of:
    - a. South Coast Air Quality Management District, SCAQMD 1113.
    - b. California Air Resources Board (CARB).
- B. For accessibility markings see Part 3 Article "Installation".
- C. Conform to State of California, Department of Transportation (CALTRANS) Standard Specifications, Section 84, Traffic Control Markings, as amended and adopted by authorities having jurisdiction.
- D. Where reference is made to Standard Specifications, the following shall apply.
  - 1. Perform off-site Work in public rights-of-way in accordance with requirements of authorities having jurisdiction. For conditions not indicated otherwise on Contract Drawings, conform to Standard Details adopted by authorities having jurisdiction, including SSPWC (Greenbook).
  - 2. Perform on-site Work as indicated and referenced on the Contract Drawings and as specified herein.

**2.02 MANUFACTURERS**

- A. Painted Pavement Markings:
  - 1. Vista Paint Corporation; 6700 100%Acrylic Traffic Marking Paint: [www.vistapaint.com](http://www.vistapaint.com).
  - 2. Sherwin Williams; 2 Coats of SW Armorseal 8100 with Armorseal High Wear Additive in second coat: [www.sherwin.com](http://www.sherwin.com).
  - 3. Behr: [www.behr.com](http://www.behr.com).
  - 4. Dunn Edwards: [www.dunnedwards.com](http://www.dunnedwards.com).
  - 5. Substitutions: Or equal.

**2.03 PAINTED PAVEMENT MARKINGS**

- A. General: Provide standard factory-mixed, quick drying and non-bleeding colors, conforming to Standard Specifications, as amended and adopted by the AHJ, City, and County, as applicable.
- B. Painted Pavement Markings: As indicated on drawings.
  - 1. Marking Paint: In accordance with AASHTO MP 24.
    - a. Parking Lots: Color(s) as indicated.
      - 1) Fast-dry type. If required by authorities having jurisdiction for Work in public rights-of-way, include reflective material in paint. Paint for marking curbs shall not require reflective material. See Color Schedule in Part 3.
    - b. Symbols and Text: Color(s) as indicated.
  - 2. Reflective Glass Beads at Accessible Parking Spaces: FS TT-B-1325, Type I (low index of refraction), Gradation A (coarse, drop-on); with silicone or other suitable waterproofing

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coating to ensure free flow.

- a. Comply with CBC Section 11B-502.6.4 Marking.
- 3. Reflective Glass Beads at Accessible Parking Spaces: Type 1, in accordance with AASHTO M 247 or FS TT-B-1325
- C. Temporary Marking Tape: Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Identify existing markings for removal.
- B. Verification of Conditions: Verify that pavement is dry and ready for installation.
- C. Notify Architect of unsatisfactory conditions before proceeding.

**3.02 PREPARATION**

- A. Establish survey control points for locating and dimensioning of markings.
  - 1. Lay out markings as shown on Drawings. Use guide lines, templates and forms for precise edges and spacings.
    - a. At off-site and on-site public rights-of-way, obtain review and approval of layout by authorities having jurisdiction.
- B. Clean surfaces prior to installation.
  - 1. Remove dust, dirt, and other debris.
  - 2. Remove rubber deposits, existing paint markings, and other coatings.
- C. Temporary Markings: Apply as directed by Architect.
- D. Apply paint stencils by type and color at necessary intervals.

**3.03 INSTALLATION**

- A. Regulatory Accessibility Requirements for Installation:
  - 1. Pavement markings for disability requirements shall meet requirements of California Building Code (CBC), Title 24, Part 2, CBC Ch. 11B and ADA Standards, per latest amendments.
    - a. Accessible parking spaces serving a particular building or facility shall be located on the shortest accessible route to an entrance complying with CBC Ch. 11B-208.3.1.
    - b. Accessible parking spaces serving more than one accessible entrance shall be dispersed and located on the shortest accessible route to the accessible entrances.
    - c. Accessible parking spaces in a parking facility not serving a particular building or facility shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility. CBC Ch. 11B-208.3.1
    - d. Minimum number of required accessible parking spaces shall be provided in accordance with CBC Ch. 11B Table 11B-208.2 for each parking facility provided on a site.

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- e. For every six or fraction of six accessible parking spaces, at least one shall be an accessible van parking space. CBC Ch. 11B-208.2.4
- f. Accessible parking spaces and access aisles shall comply with CBC Ch. 11B-502 and shall be dimensioned to the centerline of the marked lines as follows:
  - 1) Parking spaces and access aisles shall be marked according to CBC Ch. 11B Figures 11B-502.2, 11B-502.3, and 11B-502.3.3.
    - (a) Their surfaces shall comply with CBC Ch. 11B-302 and shall be at the same level with slopes not steeper than 1:48 in any direction. CBC Ch. 11B-502.4.
  - 2) Parking spaces shall be 9 x 18 feet minimum and van parking spaces shall be 12 x 18 feet minimum with an adjacent access aisle of 5 x 18 feet minimum.
    - (a) Access aisles shall be placed on either side of the parking spaces except be located on the passenger side for van parking spaces.
    - (b) Van parking spaces shall be permitted to be 9 x 18 feet minimum where the access aisle is 8 x 18 feet minimum.
  - 3) Access aisles shall be marked by a blue painted borderline around their perimeter.
    - (a) The area within the blue borderlines shall be marked with hatched lines a maximum of 36 inches on center in a color contrasting with that of the aisle surface, preferably blue or white.
    - (b) Access aisle markings may extend beyond the minimum required length. CBC Ch. 11B-502.3.3
    - (c) At drive aisle provide minimum 12 inch high white letters with the text "NO PARKING" per CBC Ch. 11B Figure 11B-502.3.3.
  - 4) Access aisles (parking spaces as well- similar application) shall not overlap the vehicular way. CBC Ch. 11B-502.3.4
  - 5) A vertical clearance of 98 inches minimum shall be provided for accessible parking spaces, access aisles, and vehicular routes serving them. CBC Ch. 11B-502.5
- 2. At least one passenger loading zone shall be provided in every continuous 100 linear feet of loading zone space, or fraction thereof, complying with CBC Ch. 11B-209 and 11B-503 as follows:
  - a. Vehicle pull-up spaces shall be 8 x 20 feet minimum.
    - 1) Access aisles shall be 5 feet wide minimum x full length of vehicle pull-up spaces they serve and shall be adjacent and parallel to the vehicular pull-up spaces.
    - 2) They shall be at the same level with slopes not steeper than 1:48 in any direction.
    - 3) Access aisle shall adjoin an accessible route and shall not overlap the vehicular way.
  - b. Access aisles for passenger drop-off and loading zone shall be marked with a painted borderline around their perimeter.

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- 1) The area within the borderlines shall be marked with hatched lines a maximum of 36 inches on center in a color contrasting with that of the aisle surface. CBC Ch. 11B-503.3.3.
    - (a) Blue perimeter lines with blue interior hatch lines are preferred for concrete surfaces and blue perimeter lines with white interior hatch lines are preferred for asphalt surfaces.
    - (b) Where white hatch lines are used, hatch lines shall be interrupted at 12 inch high "No Parking" text so that legibility is maintained.
  - c. A vertical clearance of 114 inches minimum shall be provided for vehicle pull-up spaces, access aisles, and a vehicular route serving them connecting a vehicular entrance and a vehicular exit. CBC Ch. 11B-503.5.
3. Bus loading zones and bus stops shall comply with CBC Ch. 11B-209 and 11B-810.2 as follows:
- a. Boarding and alighting areas shall be of 8 x 5 feet minimum, with 8 feet measured perpendicular to the curb or vehicle roadway edge, and with 5 feet measured parallel to the vehicle roadway.
    - 1) Slopes in 8 foot direction shall be 1:48 maximum.
    - 2) Slopes in 5 foot direction shall be the same as that of the roadway, to the maximum extent practicable. CBC Ch. 11B Figure 11B-810.2.2.
  - b. Bus shelters shall provide a minimum 30 x 48 inches clear floor or ground space (36 x 48 inches or 36 x 60 inches in an alcove per CBC Ch. 11B-305.7), with slopes not steeper than 1:48 in any direction, entirely within the shelter complying with CBC Ch. 11B-305.
  - c. Bus shelters shall be connected by an accessible route complying with CBC Ch. 11B-402 to a boarding and alighting area complying with CBC Ch. 11B-810.2 and Figure 11B-810.3.
  - d. Newly constructed bus stop boarding and alighting areas shall provide a detectable transition between the boarding/alighting area and the roadway; the detectable transition shall consist of a curb with the face sloped at 35 degrees maximum from vertical or detectable warnings complying with CBC Ch. 11B-705.1.1 and 11B-705.1.2.4.
4. Electric Vehicle Charging Stations:
- a. Where Electric Vehicle Charging Stations are provided, they shall be provided in accordance with CBC Ch. 11B-228.3, Table 11B-228.3.2.1 and CBC Ch. 11B- 812 (see 11 11 36 - Vehicle Charging Equipment for additional requirements).
  - b. Accessibility requirements for Public Use or Common Use EVCS facilities:
    - 1) Vehicle spaces and access aisles serving them shall comply with CBC Ch. 11B-302. Access aisles shall be at the same level as the vehicle space they serve. Changes in level, slopes exceeding 1:48, and detectable warnings shall not be permitted in vehicle spaces and access aisles. CBC Ch. 11B-8J2.3
    - 2) Vehicle spaces, access aisles serving them and vehicular routes serving them shall provide a vertical clearance of 98 inches minimum. CBC Ch. 11B-812.4

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- 3) Accessible routes between EVCS parking, equipment and the building or facility served shall be provided per CBC Ch. 11B-812.5
- 4) Vehicle spaces for van accessible, standard accessible, ambulatory and drive-up EVCS shall meet minimum length and width requirements per CBC Ch. 11B-812.6.
- 5) Accessible EVCS stalls shall be marked "EV Charging Only" per CBC Ch. 11B-812.9 and Figure 11B-812.9.
- 6) Access aisles for van accessible and standard accessible EVCS shall meet minimum length and width requirements and be marked per CBC Ch. 11B-812.7 the color of the perimeter, hatch lines and "No Parking" letters shall contrast with the surface color (blue color required for use at non-EVCS accessible parking shall not be used).
- 7) ISA Signs:
  - (a) Where four or fewer total EVCS are provided, identification with an International Symbol of Accessibility (ISA) shall not be required.
  - (b) Where five to twenty-five total EVCS are provided, one van-accessible EVCS shall be identified with an ISA complying with CBC Ch. 11B-703.7.2.1. The required standard accessible EVCS shall not be required to be marked with an ISA.
  - (c) Where twenty-six or more EVCS are provided, all required van-accessible and all required standard accessible EVCS shall be identified with an ISA.
  - (d) The required ISA identification sign shall be reflective with a minimum 70 square inches, shall be visible from the EVCS it serves. The sign shall be permanently posted either immediately adjacent to the vehicle space or within the projected vehicle space at the head end of the vehicle space. Signs identifying van accessible vehicle spaces shall contain the designation "Van Accessible". Signs shall be minimum 60 inches above the finish surface except that if the sign projects into a pedestrian circulation area, they shall be minimum 80 inches above finish surface CBC Ch. 11B-812.8
- 8) Ambulatory EVCS complying with CBC Ch. 11B-812.6.3 shall be required where 26 or more EVCS are provided. CBC Ch. 11B Table 11B-228.3.2.1

B. General:

1. Position pavement markings as indicated on drawings.
2. Field location adjustments require approval of Architect.

C. Painted Pavement Markings:

1. Apply in accordance with manufacturer's instructions.
2. Marking Paint: Apply uniformly, with sharp edges.
  - a. Applications: One coat.
  - b. Wet Film Thickness: 0.015 inch, minimum.
  - c. Stencils: Lay flat against pavement, align with striping, remove after application.

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- d. Glass Beads: Apply directly to paint, 10 second lag time, 6 lbs/gal of paint, uniform thickness and coverage.
  - e. Length Tolerance: Plus or minus 3 inches.
  - f. Width Tolerance: Plus or minus 1/8 inch.
3. Curbs: Paint full vertical face and first 6-inches of horizontal plane at top of curb or combination curb/paving. Provide minimum 2 coats paint.
    - a. Provide stenciled text in the height, spacing and typeface as indicated on Drawings.
  4. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
    - a. Hand application by pneumatic spray is acceptable.
  5. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

**3.04 TOLERANCES**

- A. Maximum Variation From True Position: 3 inches (76 mm).
- B. Maximum Offset From True Alignment: 3 inches (76 mm).

**3.05 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Perform field inspection for deviations from true alignment or material irregularities.
- C. If inspections indicate work does not meet specified requirements, rework and reinspect at no cost to District.
- D. Allow the pavement marking to set at least the minimum time recommended by manufacturer.

**3.06 CLOSEOUT ACTIVITIES**

- A. Temporary Markings: Remove without damaging surfaces.

**3.07 PROTECTION**

- A. Replace damaged or removed markings at no additional cost to District.
- B. Preserve survey control points until pavement marking acceptance.

**END OF SECTION**

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**SECTION 32 17 26  
TACTILE WARNING SURFACING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

**1.02 RELATED REQUIREMENTS**

- A. Section 32 12 16 - Asphalt Paving.
- B. Section 32 13 13 - Site Concrete: Concrete sidewalks.
- C. Section 32 17 23 - Pavement Markings.

**1.03 REFERENCE STANDARDS**

- A. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA).
- B. AASHTO LRFD - Bridge Design Specifications.
- C. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
- D. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- F. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
- G. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
- H. ASTM C903 - Standard Practice for Preparing Refractory Specimens by Cold Gunning.
- I. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
- J. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
- K. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
- L. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
- M. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- N. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- O. ASTM G155 - Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials.
- P. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way.
- Q. CBC Ch. 11B - California Building Code-Chapter 11B.
- R. SAE AMS-STD-595 - Colors Used in Government Procurement.

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1. Revision A.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.
- C. Samples: For each product specified provide two samples, 8 inches square, minimum; show actual product, color, and patterns.
- D. Shop Drawings: Submit plan and detail drawings. Indicate:
  1. Locations on project site. Demonstrate compliance with referenced accessibility standards.
  2. Sizes and layout.
  3. Pattern spacing and orientation.
  4. Attachment and fastener details, if applicable
- E. Installer's Qualification Statement.
- F. Warranty: Submit manufacturer warranty; complete forms in District's name and register with manufacturer.
- G. Certification: Manufacturers certification that product meets ADA for tactile warning surfaces.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience.
- B. Installer Qualifications: Company certified in writing by product manufacturer as having successfully completed work substantially similar to the work of this section.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver to project site in manufacturer's protective wrapping and in manufacturer's unopened packaging.
- B. Store covered and elevated above grade and in manufacturer's unopened packaging until ready for installation. Maintain at ambient temperature between 40 and 90 degrees F.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's standard five year warranty against manufacturing defects, breakage or deformation.

**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

- A. Detectable warnings shall comply with California Building Code, CBC Ch. 11B-705.1 requirements, CBC Ch. 11B-705.1.2 Locations and CBC Ch. 11B-705.1.2.5 Blended Transitions, for special warnings for disabled persons.

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- B. Nominal dimensions meeting CBC Ch. 11B-705.1.2 Locations.
- C. Color contrast requirements meeting CBC Ch. 11B-705.1.1.3 Contrast.
- D. Detectable warning surfaces at transit boarding platform edges, bus tops, hazardous vehicle areas, reflecting pools, and track crossings shall be yellow and approximate Federal Color No. 33538 as shown in SAE AMS-STD-595, Revision A (Table IV of Federal Standard No. 595A).
- E. Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact. Such constraint shall not be required for detectable warning surfaces at curb ramps, islands, or cut-through medians. CBC Ch. 11B-705.1.1.4 Resiliency.
- F. Color yellow for detectable warning surface is required at all hazardous vehicle locations and shall conform to Federal Color No. 33538 as shown in SAE AMS-STD-595, Revision A, (Table IV of Federal Standard No. 595A). CBC Ch. 11B-705.1.1.3 Color and Contrast.
- G. Truncated dome pattern in-line, not staggered.

**2.02 MANUFACTURERS**

- A. Plastic Tactile and Detectable Warning Surface Tiles:
  - 1. Access Tile, a brand of Access Products, Inc: [www.accesstile.com](http://www.accesstile.com).
  - 2. ADA Solutions, Inc: [www.adatale.com/#sle](http://www.adatale.com/#sle).
  - 3. Answer Industries: [www.answerindustries.com](http://www.answerindustries.com).
  - 4. Armor-Tile, a brand of Engineered Plastics, Inc: [www.armortiletransit.com/#sle](http://www.armortiletransit.com/#sle).
  - 5. Safety StepTD, Inc.; SSTD-Traditional Mat System: [www.safetystepTD.com](http://www.safetystepTD.com)
  - 6. Transpo Industries, Inc.: [www.transpo.com](http://www.transpo.com)
  - 7. Van-Duerr Industries, Inc.: [safepathproducts.com](http://safepathproducts.com).
  - 8. Substitutions: See Section 01 60 00 - Product Requirements.

**2.03 TACTILE AND DETECTABLE WARNING TILES**

- A. Plastic Tactile and Detectable Warning Tiles: ADA Standards and CBC Ch. 11B compliant, glass fiber and carbon fiber reinforced, exterior grade, matte finish polyester sheet with truncated dome pattern, solid color throughout, internal reinforcing of sheet and of truncated domes, integral radius cut lines on back face of tile; with factory-applied removable protective sheeting.
  - 1. Material Properties:
    - a. Water Absorption: 0.20 percent, maximum, when tested in accordance with ASTM D570.
    - b. Slip Resistance: 0.50 minimum dry static coefficient of friction, when tested in accordance with ASTM D2047.
    - c. Compressive Strength: 25,000 pounds per square inch, minimum, when tested in accordance with ASTM D695.
    - d. Tensile Strength: 10,000 pounds per square inch, minimum, when tested in accordance with ASTM D638.
    - e. Flexural Strength: 25,000 pounds per square inch minimum, when tested in accordance with ASTM D790.

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- f. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D543.
  - g. Abrasion Resistance: 300, minimum, when tested in accordance with ASTM C501.
  - h. Flame Spread Index: 25, maximum, when tested in accordance with ASTM E84.
  - i. Accelerated Weathering: Delta-E of less than 5.0 at 2,000 hours exposure, when tested in accordance with ASTM G155.
  - j. Adhesion: No delamination of tile prior to board failure in a temperature range of 20 to 180 degrees F, when tested in accordance with ASTM C903.
  - k. Loading: No damage when tested according to AASHTO LRFD test method HS20.
  - l. Salt and Spray Performance: No deterioration or other defect after 200 hours of exposure, when tested in accordance with ASTM B117.
2. Installation Method: Surface applied.
  3. Shape: Rectangular.
  4. Dimensions: 24 inches by 36 inches.
    - a. Curb Ramp: Cover entire width of the ramp surface, minimum 36 inches along path of travel.
    - b. Drive Aisle: 36 inches along path of travel.
  5. Dome Spacing: 2.3 to 2.4 inches per CBC Section 11B-705.1.1.2.
  6. Dome Height: 0.2 inch.
  7. Pattern: In-line pattern of truncated domes complying with ADA Standards.
  8. Edge: ADAAG compliant bevel.
  9. Joint: Butt.
  10. Color: SAE AMS-STD-595, Table IV, Federal Yellow No. 33538.
  11. Basis of Design Product: SSTD Traditional Mat System as manufactured by Safety Step TD; [www.safetysteptd.com](http://www.safetysteptd.com), or approved equal.

**2.04 ACCESSORIES**

- A. Fasteners: ASTM A666, Type 304 stainless steel
  1. Type: Countersunk, color matched composite sleeve anchors
  2. Size: 1/4 inch diameter and 1-1/2 inches long.
- B. Adhesive: Type recommended and approved by surfacing tile manufacturer.
- C. Sealant: Elastomeric sealant of color to match adjacent surfaces; approved by surfacing tile manufacturer.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. When installation location is near site boundary or property line, verify required location using property survey.

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- B. Verify that work area is ready to receive work:
  - 1. Examine work area with installer present.
  - 2. If existing conditions are not as required to properly complete the work of this section, notify Architect.
  - 3. Do not proceed with installation until deficiencies in existing conditions have been corrected.
- C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

**3.02 INSTALLATION, GENERAL**

- A. Install in accordance with manufacturer's written instructions.
  - 1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
  - 2. Do not install when ambient or substrate temperature has been below 40 degrees F during the preceding 8 daylight hours.
- B. Field Adjustment:
  - 1. Cut units to size and configuration shown on drawings.
  - 2. Do not cut tiles to less than 9 inches wide in any direction.
  - 3. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
  - 4. Orient so dome pattern is aligned with the direction of ramp.
  - 5. Align truncated dome pattern between adjacent units.
- C. Install units fully seated to substrate, square to straight edges and flat to required slope.
- D. Align units so that tops of adjacent units are flush and joints between units are uniform in width.
- E. Verify substrate is clean and dry; free of voids, projections and loose material. Remove dust, oil, grease, curing compounds, sealers and other substances that may interfere with adhesive bond or sealant adhesion.
- F. When installing multiple adjacent units, leave a 1/8 inch gap between tiles to allow for expansion.
- G. Apply adhesive to back of unit as recommended by manufacturer.
- H. Apply sealant to edges in cove profile.

**3.03 CLEANING PLASTIC UNITS**

- A. Remove protective plastic sheeting within 24 hours of installation.
- B. Remove excess sealant or adhesive from joints and edges.
- C. Clean four days prior to date of scheduled inspection.

**3.04 PROTECTION**

- A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.

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B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

**END OF SECTION**

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**SECTION 32 31 19  
DECORATIVE METAL FENCES AND GATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Decorative steel fences.
- B. Excavation for post bases; concrete foundation for posts.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 50 00 - Metal Fabrications: Custom fabricated metal components.
- B. Section 31 23 16 - Excavation: Excavation for footings.
- C. Section 32 13 13 - Concrete Paving: : Concrete anchorage for posts.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes.
- C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
- F. ASTM D523 - Standard Test Method for Specular Gloss.
- G. ASTM D714 - Standard Test Method for Evaluating Degree of Blistering of Paints.
- H. ASTM D822/D822M - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- I. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
- J. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
- K. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- L. ASTM D3359 - Standard Test Method for Rating Adhesion by Tape Test.
- M. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section; require attendance by affected installers.

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**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings:
  - 1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
- D. Installer's Qualification Statement.
- E. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines.
- F. Field Inspection Records: Provide installation inspection records that include post settings, framework, fittings and accessories, gates, and workmanship.
- G. Maintenance Materials: Furnish the following for District's use in maintenance of project:
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Experienced with type of construction involved and materials and techniques specified and approved by fence manufacturer.
- C. Fabricator's Qualifications: Fabricator of light structural steel framing members and other miscellaneous metal fabrications of structural character shall have a minimum 5 years experience fabricating similar fences and gates and shall be approved by the Building Official in accordance with applicable Code provisions.
- D. Welder's Qualifications: Welding shall be performed by certified welders qualified in accordance with procedures specified in applicable referenced AWS standard, using materials, procedures and equipment of the type required for the Work. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.
- E. Coordination: Provide templates and sleeves for incorporation of embedded items into the work specified elsewhere herein or in other Sections.
- F. Field-Verified Dimensions: Prior to fabrication, field verify dimensions and details of construction. Immediately report variances in writing to Architect.

**1.07 DELIVERY, STORAGE AND HANDLING**

- A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

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**1.08 WARRANTY**

- A. Correct defective Work within a five year period after Date of Substantial Completion.
- B. Provide ten year warranty for finish.

**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS:**

- A. Provide fences and gates meeting life safety and accessibility requirements of California Building Code (CBC) Title 24, Part 2, Chapters 10 and 11B; and ADA Standards, per latest amendments.
  - 1. Gates that are part of the accessible route shall meet all the requirements of an accessible door in compliance with CBC Section 11B-404 and 11B-206.5.
  - 2. Gate Hardware: Meet the requirements of CBC 11B-206.5 and 11B-404.2.9.
    - a. Latch: Latch, including padlock eye as integral part of latch, mounted 40 inches above finish grade. Comply with California Fire Code.
    - b. Hardware shall comply with local Fire Authority, California Building Code (CBC) Title 24, Section 1010.2, and California Fire Code (CFC) Section 503.5.2.
    - c. The lever of lever actuated latches or locks for an accessible gate shall be curved with a return to within 1/2 inch of the (face of) gate to prevent catching on the clothing or persons. California Referenced Standards Code T-24 Part 12, Section 12-10-202, Item (F).
    - d. Hand activated opening hardware, handles, pulls, latches, locks, and other operating devices for and accessible gate shall have a shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist to operate. CBC Section 11B-404.2.7 and 11B-309.4.
  - 3. Swing doors and gate surfaces within 10 inches of the finish floor or ground shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16 inch of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped. CBC Section 11B-404.2.10
  - 4. The bottom of the gate shall be within 3 inches of the finish surface of the path of travel. The maximum effort to operate a gate shall not exceed 5 lbf. CBC Section 11B-404.2.9.

**2.02 FENCES**

- A. Fences: Complete shop-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with specified coating, and having the following performance characteristics:
  - 1. Capable of resisting vertical load, horizontal load and infill performance requirements for fence categories defined in ASTM F2408.
- B. Electro-Deposition Coating: Multistage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
  - 1. Total Coating Thickness: 2 mils, minimum.

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2. Color: As selected by Architect from manufacturer's standard range.
3. Coating Performance: Comply with general requirements of ASTM F2408.
  - a. Adhesion: ASTM D3359 (Method B); Class 3B with 90 percent or more of coating remaining in tested area.
  - b. Corrosion Resistance: ASTM B117, ASTM D714 and ASTM D1654; 1/8 inch coating loss or medium No.8 blisters after 1,500 hours.
  - c. Impact Resistance: ASTM D2794; 60 inch pounds.
  - d. Weathering Resistance: ASTM D523, ASTM D822/D822M and ASTM D2244; less than 60 percent loss of gloss.
- C. Steel: ASTM A653/A653M; tensile strength 45,000 psi, minimum.
  1. Hot-dip galvanized; ASTM A653/A653M, G60.
  2. 62 percent recycled steel, minimum.
- D. Fasteners: ASTM A276/A276M, Type 302 stainless steel; finished to match fence components.
  1. Self-drilling hex-head screws.

**2.03 WELDED STEEL FENCE**

- A. Posts: Steel tube.
  1. Size: As indicated on Drawings.
  2. Post Cap: Flush plate, watertight.
- B. Hinged Gates:
  1. Steel Gate: Fabricated steel gate, ASTM A500/A500M, Grade B., Size as indicated on Drawings. See Section 05 50 00 - Metal Fabrications.
  2. Construction: Match adjacent fence
    - a. Provide cable kits for additional trussing for all gates leaves over 6 ft..
    - b. Infill Panel:
      - 1) Perforated Panels: ASTM A653/A653M G90 Galvanized steel panel, staggered perforated pattern. Paint to match fence.
    - c. Gate Kick Plate: Provide on push side, full width to minimum 10 inches high above finish surface, 0.1382 inch thick, galvanized ASTM A653/A653M welded to gate frame.

**2.04 SPECIALITY HARDWARE**

- A. Pedestrian Gate Hardware: Provide non-lift-off type and 180 degree opening hinges, latches, drop bolts, and other hardware required.
  1. See Section 08 71 00 - Door Hardware for specific items.
  2. Hardware to comply with local Fire Authority, California Building Code (CBC) Title 24 section 1013; and California Fire Code (CFC) section 503.5.2.
    - a. Hardware to be operable with single effort lever-type hardware, or other hardware designed to provide passage without grasping or twisting.

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3. Double and Single Leaf Gates: Provide with mechanisms for padlocking gates in open position.
  4. Double Gates Not in Path of Travel or Egress: Provide gate stops set in concrete to engage center drop rod or plunger bar. Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.
  5. Gates across an exit to a public way or to a safe dispersal area shall have panic hardware. No padlocks or cane bolts shall be allowed.
- B. Gate Hardware, Not on on Path of Travel: <>
1. Hinges:
    - a. Size and type as determined by manufacturer.
    - b. Provide 2 hinges for each leaf up to 6 feet high and 1 additional hinge for each additional 24 inches in height or fraction thereof.
  2. Latch: 3/4 inch diameter slide bolt to accommodate padlock.
  3. For double gates provide padlockable, 5/8 inch diameter center cane bolt assembly and strike.
- C. Hinges: Finished to match fence components.
1. Closing: Self.
  2. Mechanism: Hydraulic.
  3. Material: Steel.
  4. Mounting: External.
  5. Brackets: Round.
  6. Bearings: Plain.
  7. Products:
    - a. Loconix; Mammoth: [www.loconix.com](http://www.loconix.com).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

**2.05 FABRICATION**

- A. Metal Fences, Gates and Components: Fabricated of galvanized steel construction, all welded with welds ground smooth. Provide steel anchors for securing into adjoining construction. Weld anchors to frames not more than 12 inches from both top and bottom and space anchors not more than 24 inches apart.
- B. Swinging Gates: Fabricate gates of galvanized steel framework with infill panels as specified herein. Provide with latch of type to permit operation from either side of gate by means of lever handles, and incorporating a padlock eye as integral part of latch. Latch shall be mounted 40 inches above finish grade. Comply with California Fire Code (CFC) Article 1208.
  1. On gates over 5 feet; Install diagonal cross bracing consisting of 3/8 inch diameter truss rods with drop forged steel turnbuckles where necessary to insure frame rigidity without sag or twist.

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**2.06 ACCESSORIES**

- A. Concrete: Ready-mixed, complying with ASTM C 94/C 94M; normal Portland cement; 2,500 psi strength at 28 days, 3 inch slump; 3/4 inch nominal size aggregate.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Field Inspection of Fabricated Products: Prior to installation, inspect products for damage and verify markings and dimensions against reviewed submittals.
- D. Coordination: Coordinate fence and gate Work with Work specified in other Sections so that related Work shall be accurately and properly joined. Furnish templates for exact location of items to be embedded in concrete or masonry.

**3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Obtain Architect's review prior to site cutting or making adjustments not indicated on Drawings and reviewed shop drawings.
- C. Clean and strip site primed steel items to bare metal where site welding is necessary.
- D. Make provision for erection loads with temporary bracing. Keep work in alignment.
- E. Provide items required to be cast into concrete with setting templates. Coordinate placement with adjacent Work.
- F. Clean and prime field welds. Touch up galvanized steel with cold repair compound.

**3.03 INSTALLATION**

- A. Installation, General: Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Install in accordance with fabricator's instructions.
- C. Set fence posts in accordance with the approved spacing.
- D. Perform field welding in accordance with AWS D1.1/D1.1M. All welds ground smooth.
- E. When cutting rails immediately seal the exposed surfaces by:
  - 1. Removing metal shavings from cut area.
  - 2. Apply zinc-rich primer or galvanizing patch compound to thoroughly cover cut edge and drilled hole; allow to dry.
  - 3. Apply two coats of custom finish spray paint matching fence color.
- F. Space gate posts according to the manufacturers' drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.
  - 1. Base type and quantity of gate hinges on the application, weight, height, and number of gate cycles.

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2. Identify the necessary hardware required for the application on the manufacturer's gate drawings.
  3. Provide gate hardware as specified for the gate and install per manufacturer's recommendations
- G. Excavate post holes in accordance with Section 31 23 16.
- H. Install posts in concrete by means of pipe sleeve inserts set and anchored in concrete. Fill annular space between pipe posts and sleeve inserts with grouting compound.
- I. Set line posts in concrete footing.
1. Diameter: 12 inch minimum to maintain 3 inch concrete cover. Unless otherwise indicated or detailed on Drawings.
  2. Provide 36 inches minimum embedment of posts up to 8'-0".
  3. Provide 6 inches minimum concrete beneath post bottom.
- J. Provide concrete center drop to footing depth and drop rod retainers at inactive leaf, at center of double gate openings.

### 3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From Indicated Position: 1 inch.
- C. Minimum Distance from Property Line: 6 inches.

### 3.05 FIELD QUALITY CONTROL

- A. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.
- B. Post Settings: Randomly inspect three locations against design for:
  1. Hole diameter.
  2. Hole depth.
  3. Hole spacing.
- C. Fence Height: Randomly measure fence height at three locations or at areas that appear out of compliance with design.
- D. Gates: Inspect for level, plumb, and alignment.
- E. Workmanship: Verify neat installation free of defects.

### 3.06 CLEANING

- A. Leave immediate work area neat at end of work day.
- B. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
- C. Clean fence with mild household detergent and clean water rinse well.
- D. Touch up scratched surfaces using visually materials recommended by manufacturer. Match touchup paint color to fence finish.

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1. Galvanized Touch-Up: Touch up surfaces immediately after installation, including field welding. Prepare surface and apply cold repair compound in compliance with the product manufacturer's instructions and recommendations.
  - a. Material: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction. Provide finish coat to match galvanized finish.
- E. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

**3.07 CLOSEOUT ACTIVITIES**

- A. Demonstrate proper operation of equipment to District's designated representative.
- B. Demonstration: Demonstrate operation of system to District's personnel.
  1. Use operation and maintenance data as reference during demonstration.
  2. Briefly describe function, operation, and maintenance of each component.

**3.08 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

**END OF SECTION**

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