OJAI UNIFIED SCHOOL DISTRICT

NEW ELECTRICAL SERVICE & SITE IMPROVEMENTS

At

TOPA TOPA ELEMENTARY SCHOOL

PROJECT MANUAL
CONSTRUCTION DOCUMENTS
A# 03-121339
DSA FILE NO. 56-21

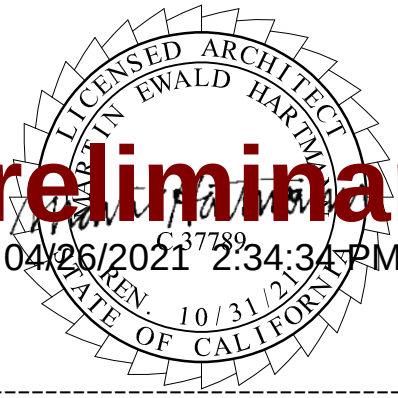
MARCH 31, 2021

HARTMANN
ARCHITECTURE
STUDIO

PROJECT MANUAL
FOR
TOPA TOPA ELEMENTARY SCHOOL
NEW ELECTRICAL SERVICE & SITE IMPROVEMENTS

OJAI UNIFIED SCHOOL DISTRICT
OJAI, CALIFORNIA

SPECIFICATIONS



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Martin Hartmann C 37789
Hartmann Architecture Studio
Architect
430 S. Carrillo Rd.
Ojai, CA 93023
(805) 530-5559

Preliminary

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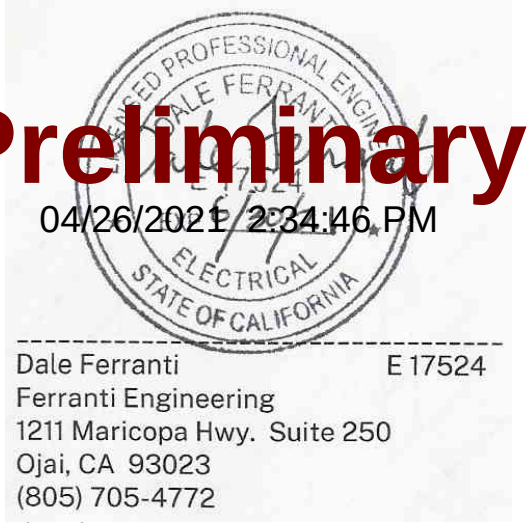
03.29.2021

James Vinci S4411
Vinci & Associates Structural Engineers
Structural Engineer
175 E. Wilbur Rd.
Thousand Oaks, CA 91360
(805) 496-2100



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Dale Ferranti E 17524
Ferranti Engineering
1211 Maricopa Hwy. Suite 250
Ojai, CA 93023
(805) 705-4772

HARTMANN ARCHITECTURE STUDIO
430 S. CARRILLO RD.
OJAI, CA 93023
(805) 530-5550

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SECTION 01 10 00
SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Work covered by the Contract Documents.
   2. Type of the Contract.
   3. Work phases.
   4. Use of premises.
   5. Owner's occupancy requirements.
   6. Work restrictions.
   7. Specification formats and conventions.
   8. Deferred Approvals.
   9. Pollution Control.
   10. Storm Water Pollution Prevention Plan.
   11. Lead-Containing materials.
   12. Additional DSA requirements.

B. Related Sections include the following, but not limited to:
   1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
   2. Division 1 Section “Closeout Procedures” for mechanical and electrical Title 24 Certificate of Acceptance requirements.

1.3 SUBMITTALS

Contractor shall submit written statement of responsibility per CBC 1706A.1

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Site improvements and electrical service upgrade at an existing elementary school.
   1. Topa Topa Elementary School
      916 Mountain View Ave.
      Ojai, CA 93023

B. Owner: Ojai Unified School District.

C. Architect: Hartmann Architecture Studio.

D. The Work consists of the following:
   1. In summary, the work includes the construction of a new electrical equipment enclosure in front of the school and the installation of a new transformer and switchboard to serve the school. Two existing electrical meters and switchboards will remain in place and be energized from the new service. The enclosure will be constructed with concrete masonry units and chain link fencing.

      See detailed project scope of work on drawing sheet G-001.

   2. The intent of these drawings and specifications is that the alteration, rehabilitation or reconstruction is to be in accordance with Title 24, California Code of Regulations. Should any existing conditions such as deterioration or non-complying construction be discovered which is not covered by the contract documents wherein the finished work will not comply with Title 24, California Code of Regulations, a change order, or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by the District before proceeding with the repair work.

1.5 TYPE OF CONTRACT

A. Project will be constructed under a competitively bid public contract.

1.6 WORK PHASES

A. The Work shall be conducted in single phase.

1.7 USE OF PREMISES

A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.

B. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
   2. Driveways and Entrances: Keep driveways parking garage, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
      a. Schedule deliveries to minimize use of driveways and entrances.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.8 OWNER'S OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: Owner will occupy site and existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits, unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

B. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of building.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

1.9 WORK RESTRICTIONS

A. On-Site Work Hours:
1. Comply with General Conditions.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

1.10 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 49-division format and CSI's MasterFormat 2016 numbering system.
1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.11 DEFERRED APPROVALS (WHEN NEEDED)

A. Deferred approval items are listed on Drawings.

B. Contractor is solely responsible for obtaining all necessary approvals and all costs associated with obtaining the approval of DSA including all Architectural and Engineering fees for coordinating with DSA beyond review and shipping of two separate Contractor provided submittals. Do not commence installation of any deferred approval item until all approvals have been obtained.

C. Deferred Approvals. Only where a portion of the construction cannot be adequately detailed on the approved plans because of variations in product design and/or manufacturer, the approval of plans for such portion, when specifically accepted by DSA, may be deferred until the material suppliers are selected provided the following conditions are met:
    1. The project plans clearly indicate that a deferred approval by DSA is required for the indicated portions of the work prior to fabrication and installation.
    2. The project plans and specifications adequately describe the performance and loading criteria for such work.
    3. An architect or registered engineer stamps and signs the plans and specifications for the deferred approval item. The architect or engineer in general responsible charge of the design of the project shall submit the plans and specifications for the deferred approval item to the enforcement agency, with notation indicating that the deferred approval documents have been found to be in general conformance with the design of the building.
    4. Fabrication of deferred approval items shall not begin without first obtaining the approval of plans and specifications by DSA.

D. Deferred Approval Submittals, General:
    1. Submit initial deferred approval submittal to Architect within 35 calendar days from the date of issuance of Notice to Proceed, and before any materials are delivered to the job site. Contractor is solely responsible for obtaining all necessary approvals. Do not commence installation of any deferred approval item until all approvals have been obtained.
    2. Product Data: Submit manufacturer’s specifications and certified test reports made by an independent testing organization for each type and class of material to show compliance with code requirements and gain approval of DSA.

3. Shop Drawings: Submit complete shop drawings including dimensioned plans, elevations, and all details of typical sections and connections. Shop drawings shall show design loads and all details of the installation. Title sheet of shop drawings shall list testing requirements and shall state that licensed engineer shall review and certify the completed installation is in accordance with the approved shop drawings. Shop drawings shall be stamped, dated and signed by professional engineer licensed in the State of California as evidence of his or her responsibility for the work.
4. Shop drawings:
   a. Format: 30" x 42" sheet format with border and title block identifying, at a minimum, the project name, project number, project location, date, contractor and structural engineer of record.
   b. 1 set of reproducible shop drawings each submittal review.
   c. 1 set of reproducible shop drawings for each plan check review.
   d. 1 set of reproducible mylars of shop drawings approved by DSA.
   e. Electronic files may be used with prior approval from the Architect.
5. Calculations: Submit calculations prepared by a professional engineer licensed in the State of California. Engineer shall sign, date and stamp calculations as evidence of his or her responsibility for the work.
6. Submittals shall be approved first by the Architect, then by the DSA.
7. See additional requirements in Division 1 Section "Submittal Procedures".

1.12 POLLUTION CONTROL

A. Provide positive methods, means and facilities required to prevent contamination of the soil, water or atmosphere by the discharge of noxious substances from the construction operations.

1.13 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (WHEN NEEDED)

A. The contractor shall submit a Storm Water Pollution Prevention Plan for approval by the local Agency Having Jurisdiction's Public Works and Community Development Departments. The plan shall show erosion control measures and indicate locations of staging, fueling, equipment and employee parking, and storage/stockpile locations. Locations for concrete washout shall be shown, as well as gravel site entrances and/or metal grates to keep soil from being deposited on public streets. The plan shall note that street sweeping shall occur as often as necessary, to ensure that no dirt or dust will remain on public streets. Drip pans shall be used under parked equipment and visqueen shall be shown on the plan to protect the soil in the fueling area. Only minor vehicle maintenance shall occur on-site. Maintenance shall occur in the fueling area and soil shall be protected by drip pans and visqueen.

B. Prepare a Storm Water Pollution Prevention Plan (SWPPP) and file a Notice of Intent with the State Water Resources Control Board for this project. The SWPPP will provide Best Management Practice (BMP) methods and controls for wet weather grading activities and erosion control for both onsite and offsite improvements, in accordance with the requirements of the NPDES General Permit for Storm Water Discharges Associated with Construction Activity. The SWPPP shall include an erosion control plan.

1.14 MISCELLANEOUS PROVISIONS

A. Noise and Dust Control: As specified in General Conditions.

1.15 ADDITIONAL REQUIREMENTS

A. Comply with the following:
   1. Compliance with Title 24, for Parts 1-6 and 9.
   2. Title 24, Parts 1-5 shall be kept on site during construction.
   3. Construction Change Document (Section 4-338 (c), Part 1) must be signed by all the following:
      a. A/E of Record.
      b. Owner (change order only).
      c. SEOR (when applicable).
      d. Delegated Professional Engineer (when applicable).
   4. Project Inspector and testing lab must be employed by the Owner and approved by all of the following:
      a. A/E of Record.
      b. SEOR (when applicable).

B. Tests and Inspections - Chapter 17A:
   1. All tests shall be performed by a testing facility acceptable to the architect. The testing facility shall be directly employed by the school district and no other entity or individual. Section Title 24, Part 1, Section 4-338(c).
   2. Test reports shall be addressed to, and sent to, the school district by the testing facility. Copies of all test reports shall be sent to the architect, the engineer, and the project inspector by the testing facility. All reports shall be sent within 7 calendar days of the date of the test. See Title 24, Part 1, Section 4-335(d).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

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

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. All substitutions affecting access compliance safety, fire life safety, or structural safety shall be considered as Construction Change Document or Addenda, and shall be approved by DSA prior to fabrication and installation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE

A. As indicated on Drawings.

END OF SECTION

SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. Related Sections include the following:
   1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect may issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, or Changes not affecting the Structural Safety, Access Compliance or Fire & Life Safety portions of the work, on AIA Document G710, "Architect's Supplemental Instructions" or an equivalent form acceptable to District.

1.4 REQUEST FOR PROPOSAL (“RFP”)

A. Owner-Initiated Proposal Requests: Architect may issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Proposal Requests issued are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.5 PROPOSED CHANGE ORDER

A. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
   2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   4. Include costs of labor and supervision directly attributable to the change.
   5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
   6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.6 PROPOSED CHANGE ORDER FORMAT

A. As specified in General Conditions.

1.7 CHANGE ORDER PROCEDURES

A. On District's approval of a Proposal Request, Architect may issue a Change Order for signatures of Owner and Contractor.

1.8 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
   1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:
   1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
   2. Division 1 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
   1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
      a. Application for Payment forms with Continuation Sheets.
      b. Submittals Schedule.
      c. Contractor's Construction Schedule.
   2. Submit the Schedule of Values to Architect at earliest possible date but no later than 7 days before the date scheduled for submittal of initial Applications for Payment.
   3. No payment applications will be signed by the Architect prior to the Contractor submitting, and the Architect reviewing, a schedule of values.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
   1. Identification: Include the following Project identification on the Schedule of Values:
      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.
   2. Submit draft of AIA Document G703 Continuation Sheets.
   3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
      a. Related Specification Section or Division.
      b. Description of the Work.
      c. Name of subcontractor.
      d. Name of manufacturer or fabricator.
      e. Name of supplier.
      f. Change Orders (numbers) that affect value.
      g. Dollar value.
         1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
   4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
   5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
   6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
      a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
   7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
   8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
      a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
   9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. As specified in General Conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. Project meetings.
   2. Requests for Information (RFIs).

B. Related Sections include the following:
   1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
   2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
   3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.
   4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's Construction Schedule.
   2. Preparation of the Schedule of Values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Project closeout activities.
   8. Startup and adjustment of systems.
   9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.4 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
   4. Frequency of Attendance by Architect: Limited by Architect/District Contract.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
   1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Tentative construction schedule.
      b. Phasing, if any.
      c. Critical work sequencing and long-lead items.
      d. Designation of key personnel and their duties.
      e. Procedures for processing field decisions and Change Orders.

f. Procedures for RFIs.
g. Procedures for testing and inspecting.
h. Procedures for processing Applications for Payment.
i. Distribution of the Contract Documents.
j. Submittal procedures.
k. Preparation of Record Documents.
l. Use of the premises.
m. Work restrictions.
n. Owner's occupancy requirements.
o. Responsibility for temporary facilities and controls.
p. Construction waste management and recycling.
q. Parking availability.
r. Office, work, and storage areas.
s. Equipment deliveries and priorities.
t. First aid.
u. Security.
v. Progress cleaning.
w. Working hours.

3. Minutes: Record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
a. The Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility problems.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written recommendations.
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v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
1) Review schedule for next period.
b. Review present and future needs of each entity present, including the following:
1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Status of correction of deficient items.
14) Field observations.
15) RFIs.
16) Status of proposal requests.
17) Pending changes.
18) Status of Change Orders.

19) Pending claims and disputes.
20) Documentation of information for payment requests.

3. Minutes: Record the meeting minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.5 RFIs:

A. General:
1. Contractor may submit a RFI to the Architect seeking clarification or interpretation of the contract documents. If in the Contractor's opinion the nature of the RFI requires a discussion, rather than simply an answer, the Contractor shall call the Architect to have such a discussion. The results of that discussion as well as all other RFI's must be presented in writing on a form approved in advanced by the Architect along with any supporting information or data, as well as the Contractor's recommended resolution. An oral RFI or a RFI presented on an unapproved form, or without adequate supporting information and Contractor's recommended solution, will be attributed solely to the contractor. Architect's review of or responses to RFI's shall not constitute an approval, direction, or procedure related to the construction means, methods, techniques, sequences, or procedures of the Contractor.
2. Architect's review of or responses to RFI's shall not constitute an approval, direction, or procedure related to the construction site safety precautions, procedures, or methodology of the Contractor.
3. The use of a RFI is limited to clarification of the contract documents. Contractor will limit each RFI to a single issue. Information which is discernable from the contract documents; construction means and methods; product substitution submittals; product submittals; and construction site safety will not be addressed by the Architect in responding to a RFI.
4. Architect's response to a RFI is not a change order or directive authorizing an increase in construction cost or time.

B. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

C. Frivolous or Unnecessary RFIs: Cost of design professional’s time will be billed or deducted from progress payment.

D. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect.
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
    a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

E. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

F. Hard-Copy RFIs: Form at end of this Section.
1. Identify each page of attachments with the RFI number and sequential page number.

G. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow 15 calendar days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for coordination information already indicated in the Contract Documents.
    d. Requests for adjustments in the Contract Time or the Contract Sum.
    e. Requests for interpretation of Architect's actions on submittals.
    f. Incomplete RFIs or RFIs with numerous errors.
2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

H. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.

2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 FORMS

A. Electronic versions of attached forms will be provided upon request.
   1. RFI Form.
   2. RFI Log.

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's Construction Schedule.
   2. Submittals Schedule.
   3. Daily construction reports.

B. Related Sections include the following:
   1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
   2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
   3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
   4. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
   1. Scheduled date for first submittal.
   2. Specification Section number and title.
   3. Submittal category (action or informational).
   4. Name of subcontractor.
   5. Description of the Work covered.
   6. Scheduled date for Architect's final release or review.

B. Contractor's Construction Schedule: Submit three opaque copies of schedule, large enough (minimum 11 x 17) to show entire schedule for entire construction period.

C. Daily Construction Reports: Submit two copies at weekly intervals.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from parties involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Concurrent with the development of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the submittal schedule with the Contractor's construction schedule described above.
   1. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
   2. The Architect will review the schedule and indicate which submittals may be deleted from the submission requirement. The deletion of the submittal requirement for an item does not release the Contractor from any requirements of the Construction Contract, General Conditions or Plans and Specifications.

B. Prepare the schedule in chronological order; include submittals required prior to products and materials arriving on site or during the first 90 days of construction. Provide the following information:
   1. Scheduled date for the first submittal.
   2. Related Section number.
   3. Submittal category.
   4. Name of subcontractor.
   5. Description of the part of the Work covered.
   6. Scheduled date for resubmittal.
   7. Scheduled date the Architect's final release or review.

C. Distribution: Following response to initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the project meeting room and field office.
   1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

D. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule. Submit within 15 days of the date established for "Commencement of the Work". The Construction Schedule must be submitted and accepted prior to approval of first pay application.
   1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as identified in the "Schedule of Values".
   2. Within each time bar indicate estimated completion percentage in 10 percent increments. As work progresses, place a contrasting mark in each bar to indicate Actual Completion.
   3. Prepare the schedule on a sheet, or series of sheets, of stable reproducible media, of sufficient width to show data for the entire construction period.
   4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
   5. Coordinate the Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.
   6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.

B. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by requirements for phased completion to permit work by separate Contractors and partial occupancy by the Owner prior to Substantial Completion.

C. Work Stages: Indicate important stages of construction for each major portion of the Work, including testing and installation.

D. Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the Work. Indicate where each element in an area must be sequenced or integrated with other activities.

E. Cost Correlation: At the head of the schedule, provide a two item cost correlation line, indicating "pre-calculated" and "actual" costs. On the line show dollar-volume of work performed as of the dates used for preparation of payment requests.
   1. Refer to Section "Applications for Payment" for cost reporting and payment procedures.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
   1. List of subcontractors at Project site.
   2. List of separate contractors at Project site.

3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial Completions and occupancies.
19. Substantial Completions authorized.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At two-week intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with updated schedule that indicates changes, including, but not limited to, changes in durations, actual starts and finishes, and activity durations.
   3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of reviewed schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post copies in Project meeting rooms and temporary field offices.
   2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.2 FORMS

A. Electronic versions of attached forms will be provided upon request.
   1. Submittals Schedule Form.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Consult individual sections of specifications for specific submittals required under those sections and for further details and descriptions of requirements.

C. Related Sections include the following:
   1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
   2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
   3. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
   4. Division 1 Section "Quality Requirements" for submitting test and inspection reports.
   5. Division 1 Section "Closeout Procedures" for submitting warranties.
   6. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
   7. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
   8. Divisions 2 through 33 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. Processing: All costs for printing, preparing, packaging, submitting, mailing, or delivering submittals for initial submittals and all costs for re-printing, re-drawing, re-drafting, re-packaging, re-submitting, and re-mailing or re-delivering as required for all re-submittals shall be included in Contract Sum.

B. Sequence: Transmit each submittal in sequence which will not result in Architect's approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.

C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
      a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

E. Multiple Reviews: The Contractor shall also be responsible for all costs to Architect or Architect consultants for reviews requiring more than 2 reviews for same specification section.

F. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   1. Review: Allow 21 days for review of each submittal. Architect will request for more time if needed.

G. Identification: Place a permanent label or title block on each submittal for identification.
   1. Indicate name of firm or entity that prepared each submittal on label or title block.
   2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
   3. Include the following information on label for processing and recording action taken:
      a. Project name.
      b. Date.
      c. Name and address of Architect.
      d. Name and address of Contractor.
      e. Name and address of subcontractor.
      f. Name and address of supplier.
      g. Name of manufacturer.
      h. Each submittal number shall be unique as follows:
         1) Format shall be as follows:

a) Sequential Number - Revision Number - Project Specification Section Number (e.g., 1-1-09910). Do not use letters.

2) Submittal number shall be sequential starting with 1 (e.g., 1-#-#####).

3) First submittal for each section shall have number 1 as the "revision" number. (e.g., #-1-#####)

4) Resubmittal for same specification section shall have same first digit as the original submittal and sequential second digit revision number (e.g., #-2-##### as in second submittal).

5) Sample submittal log would look like the following in the submittal number column: Note that 1-2-09910 is second submittal.

Submittal Number
1-1-09910
1-2-09910 (revised submittal: shown for clarity)
2-1-05500
3-1-04200

i. Number and title of appropriate Specification Section.

j. Drawing number and detail references, as appropriate.

k. Location(s) where product is to be installed, as appropriate.

l. Other necessary identification.

H. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

I. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

J. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Use AIA Document G810.
2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

K. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked "No Exceptions Taken" or "Furnish as Noted".

L. 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.

M. Use for Construction: Use only final submittals with mark indicating no exceptions taken by Architect.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
      a. Circle items applicable.
      b. Cross-out items not applicable.
      c. Select item number if required.
   3. Submittal data must include complete documentation relating to all the specified features
   4. Include the following information, as applicable:
      a. Manufacturer’s Submittal Form with all the options selected when available.
      b. Manufacturer's written recommendations.
      c. Manufacturer's product specifications.
      d. Manufacturer's installation instructions.
      e. Standard color charts.
      f. Manufacturer's catalog cuts.
      g. Wiring diagrams showing factory-installed wiring.
      h. Printed performance curves.
      i. Operational range diagrams.
      j. Mill reports.
      k. Standard product operation and maintenance manuals.
      l. Compliance with specified referenced standards.
      m. Testing by recognized testing agency.
      n. Application of testing agency labels and seals.
      o. Notation of coordination requirements.
   5. Submit Product Data before or concurrent with Samples.
   6. Number of Copies: Submit 6 copies of Product Data, unless otherwise indicated. Architect will return 2 copies. Mark up and retain one returned copy as a Project Record Document.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Dimensions.
   b. Do not use words "by others." Use words which depict exactly who is responsible for the work.
   c. Identification of products.
   d. Fabrication and installation drawings.
   e. Roughing-in and setting diagrams.
   f. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
   g. Shopwork manufacturing instructions.
   h. Templates and patterns.
   i. Schedules.
   j. Design calculations.
   k. Compliance with specified standards.
   l. Notation of coordination requirements.
   m. Notation of dimensions established by field measurement.
   n. Relationship to adjoining construction clearly indicated.
   o. Seal and signature of professional engineer if specified.
   p. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 inches by 42 inches.
3. Number of Copies: Submit 4 sets of prints.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
   1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
   2. Identification: Attach label on unexposed side of Samples that includes the following:
      a. Generic description of Sample.
      b. Product name and name of manufacturer.
      c. Sample source.
      d. Number and title of appropriate Specification Section.
   3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
      a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
      b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
   4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
      a. Number of Samples: Submit 1 full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.
4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect will return two copies.
    a. Mark up and retain one returned copy as a Project Record Document.

F. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

G. Application for Payment: Comply with requirements specified the “Construction Services Agreement – CSA”

H. Schedule of Values: Comply with requirements specified in the “Construction Services Agreement – CSA”

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit 2 copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 1 Section "Project Management and Coordination."

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

J. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

K. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
   1. Name of evaluation organization.
   2. Date of evaluation.
   3. Time period when report is in effect.
   4. Product and manufacturers' names.
   5. Description of product.
   6. Test procedures and results.
   7. Limitations of use.

L. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."

M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed

before installation of product, for compliance with performance requirements in the Contract Documents.

N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."

Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

S. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

T. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

2.3 DEFERRED APPROVALS AND DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit 3 copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
   1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
   1. Coordinate the work; do not delegate responsibility for coordination to any subcontractor.
   2. Anticipate the interrelationship of all subcontractors and their relationship with the total work.
   3. Resolve differences or disputes between subcontractors and materials suppliers concerning coordination, interference, or extent of work between sections.
   4. Trade submittals with “By Others”, “By General Contractor”, or similar coordination and work scope are not allowed. Identify, acknowledge, and resolve scope of work prior to submittal by Contractor. No extras will be allowed. Provide complete and coordinated submittals.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

F. Architect’s and Consultant’s review shall neither be construed as complete check nor relieve the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract unless the Contractor has, in writing, called the Architect’s attention to the deviations at the time of submission as specified.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. For Testing and Inspection Requirements for School Projects, comply with requirements of Division 1 Section “Testing and Inspection Requirements for School Projects”.

C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

D. Related Sections include the following:
   1. Division 1 Section “Testing and Inspection Requirements for School Projects” as would be required for DSA certified project inspections.
   2. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
   3. Division 1 Section “Cutting and Patching” for demo and patching of areas affected.
   4. Divisions 2 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups:
   1. Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
   2. Comprehensive, completely integrated mockups of separate trades showing interface conditions, transitions, and relationships between materials and finishes.
   3. Areas: As indicated on Drawings.

D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

I. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of 5 previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Professional Engineer Qualifications: A licensed professional engineer who is legally qualified to practice in California and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: A DSA approved NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
   1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.

2. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

A. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."

B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

C. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

E. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work.
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

F. All work shall be in compliance with 2019 Title 24, Parts 1-6 and 9.

G. 2019 Title 24, Parts 1-5 shall be kept on site during construction.

1.8 SPECIAL TESTS AND INSPECTIONS

A. DSA Required Tests and Inspections: Comply with requirements of Section “Testing and Inspection Requirements for School Construction”.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 41 00
TESTING AND INSPECTION REQUIREMENTS FOR SCHOOL CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for testing and inspection requirements for school construction.

1.3 SUBMITTALS

A. Reports: Prepare and submit certified written reports that include the following:
   1. Reports from testing laboratories.
   2. Verified reports by testing laboratories.

1.4 TESTS

A. General: Tests of materials are required as set forth in these regulations. Whenever there is insufficient evidence of compliance with any of the provisions of this code or evidence that any material or construction does not conform to the requirements of this code, DSA may require tests as proof of compliance to be made at no expense to DSA. Test method shall be as specified by this code or by other recognized and accepted test standards. If there are no recognized and accepted test methods for the proposed alternate, the architect or engineer shall submit written test procedure for review and acceptance by DSA.

B. Tests and Inspections - Chapter 17A:
   1. All tests shall be performed by a testing facility acceptable to the architect and DSA. The testing facility shall be directly employed by the school district and no other entity or individual. Section Title 24, Part 1, Section 4-335(a).
   2. Test reports shall be addressed to, and sent to, the school district by the testing facility. Copies of all test reports shall be sent to DSA, the architect, the structural engineer, and the project inspector by the testing facility. All reports shall be sent within 7 calendar days of the date of the test. See Title 24, Part 1, Section 4-335(d).

3. A Verified Report, sighed by the California licensed civil engineer in charge of the testing facility which conducted the tests, shall be submitted to DSA upon completion of the project. The verified report shall state that all tests and inspections were made as required by the DSA approved documents. If the tests or inspections indicate that materials or workmanship did not meet the requirements of the DSA approved documents, the Verified Report shall list all noncompliant work. A copy of all test reports involving unresolved noncompliant work shall be attached to the Verified Report. In the event that not all required tests or inspections were made by the testing facility making this verified report, those tests and inspections not made shall be listed on the Verified Report. See Title 24, Part 1, Section 4-335(e).

C. All tests shall be made by an approved agency. Where job conditions warrant, the architect or registered engineer may waive certain tests with the approval of DSA. A copy of the list of structural tests and inspections prepared by the responsible architect or structural engineer and acceptable to DSA shall be provided to the designated testing agency and the project inspector prior to the start of construction.

D. The Owner will select an independent testing laboratory approved by DSA to conduct the tests. Selection of the material required to be tested shall be by the laboratory or the Owner's representative and not by the Contractor.

E. The Contractor shall notify the Owner's representative a sufficient time in advance of the manufacture of material to be supplied by him under the Contract Documents, which must be terms of the contract be tested, in order that the Owner may arrange for the testing of same at the source supply.

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

G. The Owner will select and pay testing laboratory costs for all tests and inspections, but may be reimbursed by the Contractor for such cost under the Contract documents.

1.5 TEST REPORTS

A. One copy of all test reports shall be forwarded to the Division of the State Architect, the Architect, the Structural Engineer, and the Project Inspector by the testing agency. Such reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall be also reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Title 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state definitely whether or not the material or materials tested comply with requirements.

1.6 VERIFICATION OF TEST REPORTS

A. Each testing agency shall submit to the Division of the State Architect a verified report in duplicate covering all the tests which are required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, coring all tests.

B. Any person who continues working on the cited work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to penalties as prescribed by law.

1.7 INSPECTION BY THE OWNER

A. The Owner and his representatives shall at all times have access for the purpose of inspection to all parts of the work and to the shops wherein the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.

B. The Owner shall have the right to reject materials and workmanship, which are defective, or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the Contractor does not correct such rejected work within a reasonable time, fixed by written notice, the Owner may correct same and charge the expense to the Contractor.

Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of the work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. 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.

1.8 INSPECTOR - OWNER'S

A. A DSA certified Project Inspector and Special Inspector, when needed, shall be employed by the Owner in accordance with the requirements of the California Code of Regulations, Title 24, Part 1, will be assigned to the work. His or her duties are specifically defined in Section 4-342, 4-335, 4-336, and 4-337 of Title 24, Part 1.

B. Selection of Project Inspector will be approved by Architect of Record, Structural Engineer, and DSA.

C. The work of construction in all stages of progress shall be subjected to personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and

manner of work and character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill his Contract.

1.9 INSPECTOR - OWNER - FIELD OFFICE

A. The Contractor shall provide for the use of the Owner's Inspector a temporary office to be located as directed by the Inspector and to be maintained until removal is authorized by the Owner. This office shall be of substantial waterproof construction with adequate natural light and ventilation by means of stock design windows. The door shall have a lock. A table satisfactory for the study of plans and two chairs shall be provided by the Contractor. The Contractor shall provide and pay for adequate electric lights, private local telephone service with a loud exterior bell, and adequate heat for this field office until the completion of the Contract.

1.10 CERTIFICATION OF CONSTRUCTION

A. Observation by Architect or Registered Engineer, inspection by project inspector, and special inspection: Per Title 24, Part 1 Section 4-333.

B. Verified Reports: Per Title 24, Part 1 Section 4-336 and 4-341 (f).

1.11 STRUCTURAL TESTS & SPECIAL INSPECTIONS

A. Provide periodic special inspection to verify weld filler material identification markings are per AWS designation listed on the DSA approved documents and the WPS.

B. Provide periodic special inspection to verify weld filler material manufacturer's certificate of compliance.

C. Provide periodic special inspection to verify WPS, welder qualifications and equipment. Reference DSA IR 17-3.

D. Provide continuous special inspection for groove, multi-pass, and fillet welds >5/16" per AISC 360 (and AISC 341 as applicable). Reference DSA IR 17-3.

E. Provide periodic special inspection for single-pass fillet welds >5/16" per AISC 360 (and AISC 341 as applicable). Reference DSA IR 17-3.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

A. Statement of Structural Tests & Special Inspections as indicated in DSA-103:
   1. Welding: DSA IR 17-3 AWS D1.1 (AWS D1.3 for cold formed steel) Verification of Materials, equipment, welders, etc.
      a. Verify weld filler material identification markings per AWS designation listed on the DSA approved documents and the WPS. TYPE: Periodic PERFORMED BY: SI
      b. Verify weld filler material identification markings per AWS designation listed on the DSA approved documents and the WPS. TYPE: Periodic PERFORMED BY: SI

c. Verify WPS, welder qualifications and equipment. TYPE: Periodic PERFORMED BY: SI

2. Shop Welding
   a. Inspect groove, multi-pass, and fillet welds > 5/16". TYPE: Continuous; PERFORMED BY: SI
   b. Inspect single-pass fillet welds ≤ 5/16". TYPE: Continuous; PERFORMED BY: SI

END OF SECTION

SECTION 01 42 00
REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. “AHJ”: Agency having jurisdiction.

C. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

D. “Compatible”: When used for products, it shall comply with requirements including products recommended/ required by the manufacturer for warrantee acceptance.

E. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

F. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

G. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

H. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

I. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

J. “Owner”: As defined in Division 1 section “Summary”.

K. "Provide": Furnish and install, complete and ready for the intended use.

L. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
   2. Copies of standards and applicable building codes (Title 24 Parts 1-5) shall be kept on-site during construction.

D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations.

E. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized names.

F. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized names.

G. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized names.

1.4 QUALITY ASSURANCE

A. Reference Standards:
   1. Part 1 2019 California Building Standards Administrative Code, Title 24 C.C.R.
   2. Part 2 2019 California Building Code, Title 24 C.C.R.
   3. Part 3 2019 California Electrical Code, Title 24 C.C.R.
   4. Part 4 2019 California Mechanical Code, Title 24 C.C.R.
   5. Part 5 2019 California Plumbing Code, Title 24 C.C.R.
   6. Part 6 2019 California Energy Code, Title 24 C.C.R.
   7. Part 7 currently vacant
   8. Part 8 2019 California Historical Building Code, Title 24 C.C.R.
   9. Part 9 2019 California Fire Code, Title 24 C.C.R.
   10. Part 10 2019 California Existing Building Code, Title 24 C.C.R.

11. Part 11 2019 California Green Building Standards Code (CALGreen Code), Title 24 C.C.R.
12. Part 12 2019 California Referenced Standards Code, Title 24 C.C.R.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections include the following:
   1. Division 1 Section "Summary" for limitations on utility interruptions and other work restrictions.
   2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
   3. Division 1 Section "Execution Requirements" for progress cleaning requirements.
   4. Divisions 2 through 33 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer Service:
   1. Pay sewer service use charges for sewer usage by all entities for construction operations.

C. Water Service:
   1. Pay water service use charges for water used by all entities for construction operations.

D. Electric Power Service:

1. Pay electric power service use charges for electricity used by all entities for construction operations.

E. Sanitary Facilities: Pay sanitary service use charge for temporary toilets, wash facilities, and drinking water for use of construction personnel.

1.5 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.6 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with 2019 CEC.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized steel bases for supporting posts.

B. Wind Screen Fabric: Green.

2.2 TEMPORARY FIELD OFFICES

A. Contractor will be allowed to use existing on-site facilities, under conditions provided and acceptable to Owner.

B. Keep office clean and orderly.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, electric, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
   1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
   1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Install temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Install temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Ventilation and Humidity Control: Install temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

G. Electric Power Service: Install electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

H. Lighting: Install temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
   2. Install lighting for Project identification sign.

3.3 SUPPORT FACILITIES INSTALLATION

A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   1. Protect existing site improvements to remain including curbs, pavement, and utilities.
   2. Maintain access for fire-fighting equipment and access to fire hydrants.

B. Parking: Provide temporary or use designated areas of Owner's existing parking areas if approved for construction personnel.

C. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.

D. Project Identification and Temporary Signs: Provide Project identification. Install signs where directed to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.
   1. Provide temporary, directional signs for construction personnel and visitors.
   2. Maintain and touchup signs so they are legible at all times.

E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Comply with work restrictions specified in Division 1 Section "Summary."

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
   1. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

E. Site Enclosure Fence (if required): Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations or as indicated on Drawings.
   2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.

F. Install full coverage with green wind screen fabric to block viewing through construction fencing.

G. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

I. Covered Walkway: Erect structurally adequate, protective, covered walkway for passage of individuals along adjacent public street(s). Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
   1. Construct covered walkways using scaffold or shoring framing.
   2. Provide wood-plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
   3. Extend back wall beyond the structure to complete enclosure fence.
   4. Paint and maintain in a manner approved by Owner and Architect.

J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
   1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

K. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.
   1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
   2. Construct dustproof partitions with 2 layers of 3-mil polyethylene sheet on each side. Cover floor with 2 layers of 3-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.
      a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
   3. Insulate partitions to provide noise protection to occupied areas.
   4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
   5. Protect air-handling equipment.
   6. Weather strip openings.
   7. Provide walk-off mats at each entrance through temporary partition.

L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with 2013 CFC Article 87.
   1. Prohibit smoking in construction areas.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
   4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged

Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and product substitutions.

B. Related Sections include the following:
   1. Division 1 Section "References" for applicable industry standards for products specified.
   2. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
   3. Divisions 2 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor. Proposed products by manufacturers not listed in Manufacturers list.

C. Basis-of-Design: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating “or equal” products of other named manufacturers.

D. District Standard: Where a specific manufacturer's product is named and accompanied by the words "District Standard," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics pre-selected by the District.
   1. District seeks to match products currently in use on other campuses; No substitution allowed.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
   1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
   2. Form: Tabulate information for each product under the following column headings:
      a. Specification Section number and title.
      b. Generic name used in the Contract Documents.
      c. Proprietary name, model number, and similar designations.
      d. Manufacturer's name and address.
      e. Supplier's name and address.
      f. Installer's name and address.
      g. Projected delivery date or time span of delivery period.
      h. Identification of items that require early submittal approval for scheduled delivery date.
   3. Completed List: Submit 3 copies of completed product list within days specified in General Conditions. Include a written explanation for omissions of data and for variations from Contract requirements.
   4. Architect's Action: Architect will respond in writing to Contractor within 21 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit 4 copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use form provided at end of Section.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified material or product cannot be provided.
      b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, environmental, and specific features and requirements indicated.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
j. Cost information, including a proposal of change, if any, in the Contract Sum.
k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: Architect will notify Contractor of acceptance or rejection of proposed substitution within 21 days of receipt of request.
   a. Form of Acceptance: Change Order.
   b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

C. Named Product and Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

D. District Standard Products Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Reference Standards:
1. Part 1 2019 California Building Standards Administrative Code, Title 24 C.C.R.
2. Part 2 2019 California Building Code, Title 24 C.C.R.
3. Part 3 2019 California Electrical Code, Title 24 C.C.R.
4. Part 4 2019 California Mechanical Code, Title 24 C.C.R.
5. Part 5 2019 California Plumbing Code, Title 24 C.C.R.
6. Part 6 2019 California Energy Code, Title 24 C.C.R.
7. Part 7 currently vacant
8. Part 8 2019 California Historical Building Code, Title 24 C.C.R.
9. Part 9 2019 California Fire Code, Title 24 C.C.R.
10. Part 10 2019 California Existing Building Code, Title 24 C.C.R.

11. Part 11 2019 California Green Building Standards Code (CALGreen Code), Title 24 C.C.R.
12. Part 12 2019 California Referenced Standards Code, Title 24 C.C.R

B. Changes to the approved drawings and specifications shall be made by an addendum or a change order approved by the Division of the State Architect, as required by Section 4-338, Part 1, Title 24, CCR.

C. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

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

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations

on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
   2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
   3. Refer to Divisions 2 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Warranty Period: Warranty period specified in each sections are minimum requirements. Do not modify manufacturer’s standard warranty period if the manufacturer’s warranty has longer warranty period.

D. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   4. Where products are accompanied by the term "as selected," Architect will make selection.
   5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
   6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:
   1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.

2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or an equal product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with “or equal”.
6. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Product Substitutions" Article to obtain approval by Architect for use of an unnamed product.
7. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
8. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include custom or premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes standard, custom, and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution if received within 35 days after the Notice to Proceed**.** Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction and has paid any fees.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
11. Furnish samples upon requested by Architect.
12. Attached Request for Substitution Form shall used for substitution requests.

PART 3 - EXECUTION

3.1 FORMS

A. Electronic versions of attached forms will be provided upon request.
   1. Product List Form.
   2. Substitution Request Form.
   3. Similar Installation List Form.

END OF SECTION

SECTION 01 70 00
EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. General installation of products.
   2. Progress cleaning.
   3. Starting and adjusting.
   4. Protection of installed construction.
   5. Correction of the Work.

B. Related Sections include the following:
   1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
   2. Division 1 Section "Submittal Procedures" for submitting surveys.
   3. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
   4. Division 1 Section “Cutting and Patching” for procedures for demolition and final Work requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
   1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework,

investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas, and water-service piping; and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Provide protection against weather, rain, wind, storms, frost and heat so as to maintain all work and materials free from injury or damage.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 70 00

SECTION 01 73 20
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of building or structure.
   2. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

B. Remove all sheet metal, metal piping, and other materials deemed salvageable by owner and separate from other demolition waste. Neatly place on owner’s property as directed by owner.

1.5 SUBMITTALS

A. Qualification Data: For demolition firm.

B. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure other on-site operations are uninterrupted.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Use of elevator and stairs.
   5. Locations of proposed dust- and noise-control temporary partitions and means of egress.
   6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
   7. Means of protection for items to remain and items in path of waste removal from building.

C. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

D. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
   1. Comply with submittal requirements in Division 1 Section "Construction Waste Management."

1.6 QUALITY ASSURANCE

A. Reference Standards:
   1. Part 1 2019 California Building Standards Administrative Code, Title 24 C.C.R.
   2. Part 2 2019 California Building Code, Title 24 C.C.R.
   3. Part 3 2019 California Electrical Code, Title 24 C.C.R.
   4. Part 4 2019 California Mechanical Code, Title 24 C.C.R.
   5. Part 5 2019 California Plumbing Code, Title 24 C.C.R.
   6. Part 6 2019 California Energy Code, Title 24 C.C.R.
   7. Part 7 currently vacant
   8. Part 8 2019 California Historical Building Code, Title 24 C.C.R.
   9. Part 9 2019 California Fire Code, Title 24 C.C.R.
   10. Part 10 2019 California Existing Building Code, Title 24 C.C.R.
   11. Part 11 2019 California Green Building Standards Code (CALGreen Code), Title 24 C.C.R.
   12. Part 12 2019 California Referenced Standards Code, Title 24 C.C.R.

B. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

C. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

D. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

E. Standards: Comply with ANSI A10.6 and NFPA 241.

F. Predemolition Conference: Conduct conference at Project site. Review methods and procedures related to selective demolition including, but not limited to, the following:
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.7 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

   1. Comply with requirements specified in Division 1 Section "Summary."

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

   1. Before selective demolition, Owner will remove the following items:

      a. Books, furniture, equipment.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

   1. Hazardous materials will be removed by Owner before start of the Work.

   2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

   1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   5. Maintain adequate ventilation when using cutting torches.
   6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   9. Dispose of demolished items and materials promptly. Comply with requirements in Division 1 Section "Construction Waste Management."

B. Removed and Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until pick up by Owner.
   4. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. Roofing: remove portions of roofing components as necessary to accommodate new work and in a manner that can be reinstalled and/or replaced to shed water and maintain the intent of protection on roof as required by the specific interrupted roofing system.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.8 SELECTIVE DEMOLITION SCHEDULE

A. Remove shelving and flooring in library.

END OF SECTION

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. Related Sections include the following:
   1. Division 1 Section "Selective Demolition" for demolition of selected portions of the building.
   2. Divisions 2 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
   1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
   2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
   3. Products: List products to be used and firms or entities that will perform the Work.
   4. Dates: Indicate when cutting and patching will be performed.
   5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Architect's or Construction Manager's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

A. Reference Standards:
1. Part 1 2019 California Building Standards Administrative Code, Title 24 C.C.R.
2. Part 2 2019 California Building Code, Title 24 C.C.R.
3. Part 3 2019 California Electrical Code, Title 24 C.C.R.
4. Part 4 2019 California Mechanical Code, Title 24 C.C.R.
5. Part 5 2019 California Plumbing Code, Title 24 C.C.R.
6. Part 6 2019 California Energy Code, Title 24 C.C.R.
7. Part 7 currently vacant
8. Part 8 2019 California Historical Building Code, Title 24 C.C.R.
9. Part 9 2019 California Fire Code, Title 24 C.C.R.
10. Part 10 2019 California Existing Building Code, Title 24 C.C.R.
11. Part 11 2019 California Green Building Standards Code (CALGreen Code), Title 24 C.C.R.
12. Part 12 2019 California Referenced Standards Code, Title 24 C.C.R.

B. Cutting, boring, sawcutting or drilling through the new or existing structural elements to be done only when so detailed in the drawings or accepted by the Architect and Structural Engineer with the approval of DSA Representative.

C. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

D. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

E. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

F. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.6 WARRANTY

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
   5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
   6. Proceed with patching after construction operations requiring cutting are complete.

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

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for the following:
   1. Disposing of nonhazardous construction waste.

B. Related Sections include the following:
   1. Division 1 Section "Temporary Facilities and Controls" for environmental-protection measures during construction.
   2. Division 1 Section “Selective Demolition”

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging. Note: owner reserves the right to salvage and recycle and/or reuse construction waste at their discretion.
   1. Salvaged items for owner’s use include, but is not limited to all kitchen hood metals and piping.

B. 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.

1.4 PERFORMANCE GOALS

A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of 75 percent by weight of total waste generated by the Work.
   1. Not a requirement, but a goal for sustainable design. No extra cost should incur to Owner.

1.5 SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit three copies of report. Include the following information:
   1. Material category.

2. Generation point of waste.
3. Total quantity of waste in tons.
4. Quantity of waste salvaged, both estimated and actual in tons.
5. Quantity of waste recycled, both estimated and actual in tons.
6. Total quantity of waste recovered (salvaged plus recycled) in tons.
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 RECYCLING CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper/cardboard products, polystyrene products, pallets, crates, and beverage containers used by on-site workers.

B. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
   a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.2 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
   1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Inspection procedures.
   2. Warranties.
   3. Extra Materials.
   4. Final cleaning.
   5. Closeout and Final Certification of Construction.
   6. Title 24 Certificate of Acceptance requirements.

B. Related Sections include the following:
   1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
   2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
   3. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
   4. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
   5. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.
   6. Division 23 sections for mechanical Title 24 Certificate of Acceptance requirements.
   7. Division 26 sections for electrical Title 24 Certificate of Acceptance requirements.

1.3 DEFINITIONS

A. IOR: Inspector of Record.

B. Inspection: IOR will inspect, not the Architect.

1.4 SUBMITTALS

A. Submit a copy of Title 24 Certificate of Acceptance forms submitted to enforcement agency.

1.5 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting IOR's inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
   2. Advise Owner of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
   6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
   7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
   8. Complete startup testing of systems.
   9. Submit test/adjust/balance records.
   10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   11. Advise Owner of changeover in heat and other utilities.
   12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
   13. Complete final cleaning requirements, including touchup painting.
   14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. IOR's Inspection: Submit a written request for IOR's inspection for Substantial Completion. On receipt of request, Architect will either proceed with IOR's inspection process or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after IOR's inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
   1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
   2. Results of completed inspection will form the basis of requirements for Final Completion.

1.6 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final IOR's inspection for determining date of Final Completion, complete the following:
   1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
   2. Submit certified copy of Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified

copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. IOR's Inspection: Submit a written request for final IOR's inspection process for acceptance. On receipt of request, Architect will either proceed with IOR's inspection process or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after IOR's inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use form attached.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
   a. Project name.
   b. Date.
   c. Name of Architect.
   d. Name of Contractor.
   e. Page number.

1.8 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date specified in General Conditions.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Include Table of Contents.
3. Identify content with specification section number and title.
4. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the

product or installation, including the name of the product and the name, address, and telephone number of Installer.

5. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

1.9 EXTRA MATERIALS

A. Deliver to Owner's facility manager extra materials specified in each section.

B. Organize submitted materials in orderly sequence based on the table of contents of the Project Manual.
   1. Itemize each material and quantity in 8-1/2 by 11-inch paper.

C. Label each item for easy identification.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting IOR's inspection for certification of Substantial Completion for entire Project or for a portion of Project:
      a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
      b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
      c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
      d. Remove tools, construction equipment, machinery, and surplus material from Project site.
      e. Remove snow and ice to provide safe access to building.

f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Replace parts subject to unusual operating conditions.
o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
q. Clean ducts, blowers, and coils if units were operated without filters during construction.
r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
s. Leave Project clean and ready for occupancy.

3.2 TITLE 24 CERTIFICATE OF ACCEPTANCE REQUIREMENTS

A. Comply with requirements of Divisions 23 and 25.

3.3 FORMS

A. Electronic versions of attached forms will be provided upon request.
    1. Punch-List Form.

END OF SECTION

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.

B. Related Sections include the following:
   1. Division 1 Section "Closeout Procedures" for general closeout procedures.
   2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
   3. Divisions 2 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit 1 set of marked-up Record Prints.

B. Record Specifications: Submit 1 copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit 1 copy of each Product Data submittal.
   1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an understandable drawing technique.
    c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
2. Content: Types of items requiring marking include, but are not limited to, the following:
    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations below first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
    1. Record Prints: Organize Record Prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
    2. Identification: As follows:
        a. Project name.
        b. Date.
        c. Designation "PROJECT RECORD DRAWINGS."
        d. Name of Architect.
        e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
   3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
   5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
   4. Assembly in single binder with table of contents.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order

and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

3.2 FORMS

A. Electronic versions of attached forms will be provided upon request.
   1. Record Product Data Form.

END OF SECTION

SECTION 02 41 00
DEMOLITION

PART 1 - GENERAL

1.1.1 SECTION INCLUDES

A. Building demolition excluding removal of hazardous materials and toxic substances.

B. Abandonment and removal of existing utilities and utility structures.

1.2 RELATED DOCUMENTS

A. Section 01 52 40 – Construction Waste Management: Limitations on disposal of removed materials; requirements for recycling.

B. Section 31 23 23 – Backfilling: Fill material for filling holes, pits, and excavations generated as result of removal operations.

1.3 REFERENCE STANDARDS

A. 29 CFR 1926 – U.S. Occupational Safety and Health Standards.

B. NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.4 SUBMITTALS

A. Site Plan: Showing:
   1. Vegetation to be protected in areas for temporary construction and field offices.
   2. Areas for temporary and permanent placement of removed materials.
   3. Areas for temporary and permanent placement of removed materials.

B. 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.
   3. Include a summary of safety procedures.

C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.5 QUALITY ASSURANCE

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

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 SCOPE

A. Remove the entire building designated on drawings.

B. Remove paving and cubs as required to accomplish new work.

C. Within area of new construction, remove foundation walls and footings to a minimum of 3 feet below finished grade.

D. Outside area of new construction, remove foundation walls and footings to a minimum of 3 feet below finished grade.

E. Remove concrete slabs on grade within construction limits indicated on drawings.

F. Remove manholes and manhole covers curb inlets and catch basins.

G. Remove fences and gates.

H. Remove other items indicated, for salvage, relocation, and recycling.

I. Fill Excavations, open pits, and holes in ground areas generated as a result of removals, using specified fill; compact fill as specified in Division 31.

J. Fill Excavations, open pits, and holes in ground areas generated as a result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with other requirements specified in Division 1.

B. 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.
   5. Provide, erect, and maintain temporary barriers and security devices.

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.

C. Do not begin removal until receipt of notification to proceed from District.

D. Do not begin removal until built elements to be salvaged or relocated have been removed.

E. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

F. Protect existing structures and other elements that are not to be removed.

G. 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.

H. If hazardous materials are discovered during removal operations, stop work and notify Architect and College District; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

I. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

J. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Comply with requirements of Section 01 52 40 - Construction Waste Management.
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.

K. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.3 EXISTING UTILITES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permit.

B. Protect existing utilities to remain from damage.

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. 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.

F. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

G. 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.

3.4 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 52 40 - Construction Waste Management.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 DESCRIPTION: Division 1 applies to this Section. Provide reinforcing steel complete as indicated, specified and required.

A. Work In This Section: Principal items include:

1. Reinforcing bars and mesh for cast-in-place concrete.
2. Furnish and deliver to site steel bar reinforcing for masonry.

B. Related Work Not In This Section:

1. Reinforcement for precast concrete.
2. Installation of reinforcing bars in masonry.

1.02 QUALITY ASSURANCE:

A. Source Quality Control: Refer to Section 01400 for general testing requirements and to following paragraphs for specific procedures. Testing Laboratory shall perform following conformance testing shall select the test samples of bars, ties, and stirrups from material at the site or from place of distribution, each sampling including at least two 18" long pieces, and perform the following tests according to ASTM A615.

B. Identified Bars: If samples are obtained from bundles as delivered from the mill, identified as to the heat number, accompanied by the mill analyses and mill test reports, and properly tagged with Identification Certificate so as to be readily identified, perform one tensile and one bend test for each 25 tons or fraction thereof of each size of bars. Submit mill reports when samples are selected.

C. Unidentified Bars: When positive identification of bars cannot be made and when random samples are obtained, perform tests for each 10 tons or fraction thereof, one tensile and one bend test from each size of reinforcement.

D. Codes: C.B.C. Building Codes and latest Supplements thereto and "Standard Specifications for Public Works Construction" Current Edition.

E. Standards: (As Applicable)

1. ACI-301 - Specifications for Structural Concrete for Buildings.
2. ACI-315 - Details and Detailing of Concrete Reinforcement.
3. ACI-318 - Building Code Requirements for Reinforced Concrete.
4. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
5. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

6. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
7. ASTM A615 - Deformed and plain Billet-Steel Bars for Concrete Reinforcement.
8. ASTM A706 - Low-Alloy Steel deformed bars for Concrete Reinforcement.
9. AWS.D1.4 - Structural Welding Code For Reinforcing Steel.
10. CRSI - Concrete Reinforcing Steel Institute Manual of Practice.
11. CRSI-63 - Recommended Practice for Placing Reinforcing Bars.
12. CRSI-65 - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING: Deliver materials in timely manner to ensure uninterrupted progress. Store materials by methods that prevent damage and permit ready access for inspection and identification.

PART 2 - PRODUCTS

2.01 MATERIALS: Furnish materials meeting the test requirements of Paragraph "Source Quality Control" hereinbefore, as applicable, the requirements on the structural drawings and following requirements:

Reinforcing bars:	ASTM A615, Grade 60, and ASTM 706, Grade 60.
Reinforcing mesh:	ASTM A185 and A82, mesh size and gage as indicated, 60 ksi minimum tensile strength.
Tie wire:	Annealed steel, 16 gage minimum.
Welding electrodes:	AWS D5.1, 80 of 90 Series, low hydrogen Type AWS D1.4.

2.02 FABRICATION OF REINFORCING BARS:

A. Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bars with unscheduled kinks or bends are subject to rejection. Use only tested and approved bar materials.

B. Welding: All reinforcing steel subject to welding shall conform to ASTM 706. Perform welding, where shown or approved, by the direct electric arc process in accordance with AWS D1.4 using the specified low-hydrogen electrodes. Preheat 6" each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is prohibited. Do not tack weld bars. Clean metal surfaces to be welded of all loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds found defective with chisel and replace with proper welding. Employ only experienced certified welding operators. Prequalification of welds shall be in accordance with Code. Reinforcing bars to be welded shall have a maximum 0.75 carbon equivalent.

C. Marking and Shipping: Bundle bars, tag with identification, and transport and store so as not to damage any material. Keep a sufficient supply or tested and approved bars at site to avoid delays.

PART 3 - EXECUTION

3.01 INSTALLATION OF REINFORCING: Provide additional bars at sleeves and openings as required. Before placing bars, and again before concrete is placed, clean bars of loose mill scale, oil, or other coating that might destroy or reduce bond.

A. Securing in Place: Accurately place bars and wire tie in precise position where bars cross. Bend ends of wire ties away from forms. Wire tie bars to corners of ties and stirrups. Support bars according to current edition of "Recommended Practice for Placing Bar Supports" of the Concrete Reinforcing Steel Institute, using approved accessories and chairs. Use precast concrete cubes with embedded wire ties to support reinforcing steel bars in concrete placed on grade and in footings.

B. Exposed Surfaces: Provide stainless steel or plastic tipped chairs, bolsters, and accessories where exposed on exterior or interior concrete surfaces not to be painted or covered.

C. Clearances: Maintain minimum clear distances between reinforcing bars and face of concrete as indicated or directed.

D. Splices: Do not splice bars at points of maximum stress except where indicated. Lap splices as shown or required to develop the full strength or stress of bars. Stagger splices in horizontal wall bars at least 48" longitudinally in alternate bars and opposite faces. Splices to be in contact or spaced one bar diameter or 1" clear and in columns 1 1/2 bar diameter or 1 1/2 clear.

E. Field Welding of Bars: As specified for fabrication.

F. Maintaining Bars In Position: Assign a competent ironworker mechanic at every concrete placing location to inspect reinforcement and maintain all bars in the correct positions, unless permitted by Engineer, reinforcement shall not be bent after being placed in hardened concrete.

G. Reinforcing Mesh: Lap one full mesh plus 2" at splices, wire tie, and support the same as specified for bars.

3.02 MISCELLANEOUS CONCRETE WORK: Provide reinforcing for areaways, cast-in-place valve boxes, pits, splash blocks, bases, and other miscellaneous concrete as shown and required to complete all Work. Conform to applicable requirements herein.

3.03 FIELD QUALITY CONTROL: Refer to Section 01400.

A. Supervision: Perform Work of this Section under the supervision of a capable superintendent.

B. Inspection: Obtain inspection and approval of reinforcing before concrete is placed.

C. Welding Inspection: Welding done at the site, perform welding of reinforcing bars under continuous inspection of the Testing Laboratory Welding Inspector.

END OF SECTION

SECTION 03300
CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.01 Description of Work: Work included, but not necessarily limited to: Concrete footings and structural concrete, concrete slabs on grade, forms, reinforcement, vapor barriers, finishing, curing, and other work incidental thereto.

1.02 Related Sections:

The following sections contain requirements that relate to the work of this sections.

A. Excavating, Rough Grading, and Paving are specified in Division 2 Sections.

1.03 Standards:

Comply with applicable provisions of ACI 301, "Specifications for Structural Concrete for Buildings."

1.04 Submittals:

1. Product data for reinforcement, admixtures, curing compounds, waterstops, and other specified products.

2. Shop drawings for fabricating, bending, and placing reinforcement.

3. Concrete mix designs at least ten days prior to start of concrete work.

4. Laboratory test reports prepared by an approved testing agency for all tests specified.

1.05 Product Handling:

Handle and store reinforcing bars and mesh in manner to prevent excessive rusting or fouling with dirt, grease, or other coatings which might reduce or destroy bond.

1.06 Tests:

1. All reinforced structural concrete: test samples taken from each day's pour.

2. No samples: required for concrete reinforced only with temperature steel.

3. Take samples in accordance with ASTM C 31. Furnish in suitable containers to a recognized testing laboratory approved by the Architect
4. Take 4 test cylinders in at each interval. Test in accordance with ASTM C 39, 2 at 7 days, 1 at 28 days, and store and cure 1 cylinder at site to be tested only if necessary to confirm questionable laboratory test

5. In case of failure of any test, further procedure: as directed by the Structural Engineer. Cost of additional tests or core specimens because of failure of cylinder tests: borne by Contractor

6. Tests for slump: made periodically at place of deposit when cylinders are made.

PART 2 - PRODUCTS

2.01 General:

All concrete, unless otherwise approved by the Structural Engineer: transit-mixed in accordance with ASTM C 94.

2.02 Concrete Materials:

1. Cement: portland cement conforming to ASTM C 150, type II, except type V for concrete in contact with earth.

2. Cement: the product of one manufacturer and temperature of cement delivered to plant: not exceed 150 degrees F.

3. Sand: clean, washed rivers and free from foreign matter.

4. Course aggregate: thoroughly clean gravel, well graded, sized from ¼" to 1½ ".

5. Water: potable.

6. Admixtures: all floor slabs and exterior flatwork: contain air-entraining mixture conforming to ASTM C 260.

7. All concrete may contain an approved water reducing admixture.

2.03 Reinforcing:

1. Bars: ASTM A 615, Grade 60, unless otherwise noted.

2. Welded wire fabric: ASTM A 185*.*

3. Fiber reinforcement: engineered polypropylene fibers designed for secondary reinforcement of concrete slabs, only as specified on drawings.

2.04 Forms:

1. Forms: wood or steel conforming to shape, lines, and dimensions of indicated concrete designed to be removed without prying against concrete and sufficiently stable to withstand pressure of placed concrete without bow or deflection.

2. Side forms for footings, grade beams, and similar conditions: omitted if concrete can be

deposited in clean-cut trenches without cave-ins.

2.05 Membranes:

1. Vapor barrier: 8 mil polyethylene sheets. Furnish in sheets as wide as available to limit joints.

2. Curing membrane: kraft paper, non-staining building paper, or burlap.

3. Polyethylene or other covering suitable to prevent loss of surface moisture.

2.06 Fill:

Granulated fill under slabs on grade: gravel & sand as noted on the drawings in compliance with applicable provisions of Section 02300 - Earthwork.

2.07 Waterstops:

Waterstops: rubber or pvc flat dumbell or centerbulb type, size to fit joints indicated.

2.08 Construction/Expansion Strips:

Expansion strips: ½ inch thick x depth of concrete section, compressible and reexpanding filler, ASTM D 1751.

2.09 Sealer:

Sealer for exterior concrete flatwork surfaces: job-mixed 50% boiled linseed oil, 50% kerosene or mineral spirits.

2.10 Curing Compound:

Membrane-forming curing compound: ASTM C 309, Type 1, provided product is compatible with and will not affect the bonding characteristics of adhesives required for the application of finish flooring materials.

2.11 Other Materials:

Other materials not specifically described but required for a complete and proper installation of cast-in-place concrete: selected by the Contractor subject to the Architect's and Structural Engineer's approval.

2.12 Concrete Mixes:

1. Design concrete mixes as follows:

    1. For structural concrete, conform to the following criteria:

Minimum compressive strength at 28 days: 4,000 psi
Maximum aggregate size: 1-1/2”
Maximum Water/Cement Ratio = 0.60

2. Concrete for slabs, conform to the following criteria:
Minimum compressive strength at 28 days: 3,000 psi
Maximum aggregate size: ¾”
Maximum Water/Cement Ratio = 0.60

2. The water-cement ratio: basis for proportioning mixes. Proportions of materials: based on the requirements for plastic workable mixes. Water present in the aggregate: included in the quantity specified and subtracted from the amount required for the mixture.

3. Proportions of fine and coarse aggregate: varied to establish the correct proportions for strength, workability, and slump.

4. Combined aggregates: of such composition of sizes that when separated on a No. standard sieve, the weight passing the sieve: not less than 30% nor more than 50% 50% of the total.

5. Proportions of aggregates to cement: to produce a mix which will work readily into corners and around reinforcing.

6. Slump: measured in accordance with ASTM C 143.

7. When admixtures are approved, concrete mixes: adjusted to compensate for the admixture.

PART 3 - EXECUTION

3.01 Preparation:

1. Verify that all items to be embedded in concrete are in place.

2. Verify that concrete may be placed to lines and elevations indicated with all required clearance from reinforcement.

3. Remove water from excavations. Remove hardened concrete or other debris from form interiors and from mixing and conveying equipment.

4. Where footing is on dry soil or pervious material, lay waterproof sheathing paper over surfaces to receive concrete.

5. Pipes under slabs: tested and approved before any work is commenced.

6. Install vapor barrier with precautions to maintain continuity and integrity.

7. Install control joints in locations where slabs abut masonry walls and other locations indicated or directed by the Architect.

8. Do not place interior slabs exceeding 800 square feet, or exterior slabs exceeding 200 square feet between control joints.

9. Accurately establish lines and levels. Set temporary elevation markers for floor slabs not over 15 feet apart in any direction.

3.02 Placing Reinforcement:

1. Place bars and mesh accurately with splices in accordance with ACI code with splices staggered in adjacent bars.

2. Lap welded wire fabric a minimum of 8 inches.

3. Clear cover for reinforcing: 3 inches for structural concrete, 1 inch for slabs exposed to ground or weather.

4. Reinforcement: clean and free from rust, mill scale, or coatings of ice or mud. Unclean metal: thoroughly cleaned with wire brushes.

5. Reinforcement: positioned accurately and securely held in place with approved accessories, wire ties, or clips.

6. Place reinforcement within the limits of a day's pour before concreting commences.

7. Provide plank runways or other means for wheeled equipment to convey concrete to deposit points without displacing reinforcement.

3.03 Environmental Conditions:

1. For cold weather placement, follow ACI specifications for heating and protection of materials.

2. Do not place concrete in hot weather when placing temperature will cause difficulty from loss of slump, flash set, or cold joints unless Structural Engineer & Architect approves specific admixtures.

3.04 Placing Concrete:

1. Convey concrete from mixer to place of final deposit by methods that will prevent separation and loss of materials.

2. For chuting, pumping, and pneumatically placed concrete, use equipment of such size and design to ensure a continuous flow of concrete at delivery without loss or

separation of materials.

3. Deposit concrete as nearly possible in its final position to avoid segregation due to re-handling and flowing.

4. Place concrete as dry as possible consistant with good workmanship without exceeding maximum slump.

5. Retempering of concrete is prohibited.

6. Immediately after depositing, compact concrete thoroughly by agitating with mechanical vibrators to force out voids and work mixture into corners and around reinforcement.

7. Limit vibration duration to time necessary to produce satisfactory consolidation without causing segregation.

8. Apply vibrators at uniformly spaced points not farther apart than visible effectiveness of machine.

9. Place concrete at rate that concrete is at all times plastic and flows readily between bars.

10. Once placing is started, carry it on as a continuous operation until placement of panel or section is complete.

11. Do not pour a greater area than can be properly finished without checking.

3.05 Leveling and Finishing:

1. Unless otherwise indicated, slabs: even and uniform in appearance and level within plus or minus 1/8” in 10 feet.

2. Where floor drains or floor slopes are indicated, slope slabs uniformly to provide even fall for drainage.

3. For interior work to be used as a finished surface or as a substrate for applied flooring material, screed to indicated elevation and wood float after surface water has been removed and concrete set sufficiently to prevent drawing the cement paste to the surface.

4. After floating, steel trowel to a smooth even surface delayed sufficiently to prevent excessive water being worked to the surface.

5. Do not dust with dry cement or sand to take up excess water.

6. Steel trowel a second time when surface has set sufficiently to produce a “ringing” sound under the trowel and to finish hard and smooth.

7. Exterior walks and paving: screeded, floated, and broomed with stiff fiber bristle broom in a lateral direction. Tool edges.

3.06 Curing:

1. Upon finishing a slab area, apply a fog mist above the finished surface using fog nozzles to keep the air humid and prevent loss of moisture from concrete surface.

2. Produce an appearance of wet sheen on the concrete but do not permit concentration of water in one area.

3. Continue fog spray until membrane has been installed.

The following substitutes a chemical curing compound for the membrane method specified above:

4. Apply approved membrane-forming chemical curing and sealing compound in strict accordance with the manufacturer's recommendations

3.07 Application of Sealer:

Seal exposed exterior concrete with job-mixed sealer spray applied in two coats, the first coat at the rate of approximately 300 square feet per gallon and the second coat at the rate of approximately 450 square feet per gallon.

END OF SECTION

SECTION 03700
DRYPACK AND MECHANICAL ANCHORS

PART 1 - GENERAL

1.01 Description of Work: Work included, but not necessarily limited to: Placement of mechanical anchors into concrete and drypacking of baseplates, as shown on the drawings and as specified herein.

1.02 References:

A. American Society of Testing Materials (ASTM):
1. C 150 Portland Cement.

B. International Code Council Research Report
1. Wedge Anchors
a. ESR-1917 Hilti Kwik Bolt TZ by Hilti Corporation
b. ESR-2427 ITW Ramset/Redhead Trubolt
c. ESR 3037 Simpson Strong Bolt 2
d. ESR 2502 Dewalt Power Stud+SD2

2. Screw Anchors
a. ESR-2713 Simpson Titen HD Screw Anchor
b. ESR-3889 Dewalt Screw Bolt+

PART 2 - PRODUCTS

2.01 Materials:
A. Cement: Portland Cement Type II, low alkali, conforming to ASTM C 150. One brand of cement shall be used throughout the work for structural purposes.

B. Silica Sand: A factory processed oven-dried aggregate, conforming to ASTM C 144, gradation as indicated.

C. Water: Clean, fresh, free from acid, alkali, organic matter or other impurities liable to be detrimental to the concrete.

D. Mechanical Anchor:
1. Wedge Anchors
a. Hilti Kwik Bolt TZ by Hilti Corporation
b. ITW Ramset/Redhead Trubolt
c. Simpson Strong Bolt 2
d. Dewalt Power Stud+SD2
2. Screw Anchors
a. Simpson Titen HD Screw Anchor
b. Dewalt Screw Bolt+

2.02 Drypack Mix:

1. A sand-cement mixture at 3:1 ratio with enough water added to dampen the entire mixture.

PART 3 - EXECUTION

3.01 Drilling Concrete and Masonry :

A. Verification: Prior to drilling or coring, verify that all existing conditions are compatible with the proposed methods of construction as shown on the drawings and specified herein.

B. Drilling Existing Concrete: Drills used shall be a diamond core or carbide-tipped helical drill bits. Drill to required depth and diameter exercising caution so as not to spall or crack existing concrete. Use minimal water as necessary for drilling. No impact drilling allowed.

C. Hole size drilled shall be per manufacturer recommendations for the anchor utilized.

3.02 Mechanical Anchor Placement:

A. Cleaning: Clean holes with a jet of compressed air and nylon brush. Concrete holes that are fouled with oil or dust shall be cleaned with toluene and a bottle brush prior to placement of anchor.

B. Install anchor in compliance with manufacturer recommendations. Do not overtorque or damage anchor during installation.

3.03 Field Quality Control:

A. Anchor Placement: Mechanical Anchors do not need to be installed in the presence of a deputy inspector, unless specifically noted on the approved drawings.

3.04 Clean-up:

A. At completion of concrete work, remove all concrete debris, slurry, hardened concrete, and other waste products.

END OF SECTION

SECTION 04220
CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 Description of Work:

This work includes, but is not necessarily limited to, all retaining wall concrete unit masonry work, including all reinforcing steel, all accessories, mortar, and grout as shown on the drawings and specified herein.

1.02 References:

A. American Society of Testing Materials **(ASTM)**:

1. C - 94: Ready Mixed Concrete
2. C - 144: Aggregate for Masonry Mortar
3. C - 150: Portland Cement
4. C - 207: Hydrated Lime for Masonry Purposes
5. C - 270: Mortar for Unit Masonry
6. C - 404: Aggregates for masonry Grout
7. C - 595: Hydraulic Blended Cement

B. California Concrete Masonry Manufacturers= Association (CCMMA): Concrete Block Masonry Inspectors Manual.

1.03 Related Work:

A. Section 03210 - Reinforcement, ***See Drawings***
B. Section 03300 - Cast-in-Place Concrete

1.04 Quality Assurance:

A. Labor: For the actual cutting and placing of concrete masonry units, use only skilled journeyman masons who are thoroughly experienced with the materials and methods specified. All work shall be performed in accordance with the CCMMA manual.

1.05 SUBMITTALS:

A. Plant Certification: Prior to delivery of concrete unit masonry to the job site, submit a letter from the manufacturer of the concrete masonry units certifying that all concrete masonry units delivered to the job site are in conformance with the provisions of these specifications.

B. Aggregates: Submit certification that coarse and fine aggregates for grout mix are in conformance with the respective **ASTM** designation. Certification shall include a sieve analysis for that particular gradation of aggregate selected for use. Certification shall accompany the mix proportion submittal.

C. Grout Mix Proportions: Submit batch plant grout mix proportions for review. Mix proportions shall include, but not be limited to, aggregate sizes by percentage, water, design slumps, and the amount of admixtures, if any, to be added.

1.06 Product Handling:

A. Protection: Use all means necessary to protect concrete masonry materials before, during, and after installation and to protect the installed work and materials of all other trades. Prevent increase of water content in concrete masonry units from rain and other sources during shipping, storage and construction prior to grouting.

B. Delivery: Immediately after delivery to the site, masonry units shall be stacked under coverings or otherwise protected from weather exposure and from soil contact. Care shall be exercised in handling to avoid chipping and breaking. Damaged blocks will not be permitted. Units shall be stored on pallets or temporary wood floors off the ground and out of the way of other trades.

C. Replacements: In the event of damage or excessive water absorption, immediately make all repairs and replacements necessary to the approval of the Architect.

PART 2 - PRODUCTS

2.01 Materials:

A. General: Concrete masonry units shall conform to **ASTM C - 90**, normal or medium weight load bearing units, Type I, Grade N, of the sizes indicated. Units shall be steam cured, a minimum of 28-days-old when delivered to site.

B. Shrinkage, Absorption, and Water Content: Maximum linear shrinkage of units shall not exceed 0.06 of 1 % from the saturated to oven-dry condition. Water absorption shall not exceed fifteen (15#) pounds per cubic foot. Water content shall not exceed 40% of the fully saturated content of the unit.

C. Nominal Size and Type: 8"x8"xl6" Split-Face Unit, with bond beam units as required for horizontal reinforcement. Open-end units shall be permitted for cells containing vertical reinforcement.

2.02 Mortar Mixes:

A. General: All mortar shall be per **ASTM C - 270**, Type S, color shall match masonry units, use integral color at plant mixing. Compressive strength at seven (7) days shall be 1500 psi; compressive strength at twenty-eight (28) days shall be 1,800 psi.

B. Cement: Portland cement, Type II, low alkali, conforming to **ASTM C - 150.**
One brand of cement shall be used throughout the work. Cement shall have been used for at least two (2) years with the proposed aggregate without detrimental reaction.

C. Hydrated Lime: Hydrated lime conforming to the requirements of **ASTM C - 207,** Type S, containing 85% by weight of calcium oxide.

D. Fine Aggregates: Free of deleterious substances and conforming to the requirements of **ASTM C - 144.**

E. Mixing: Mortar shall be prepared by the following proportions By volume of one (1) part Portland Cement to three (3) parts sand to one quarter (1/4) part lime. Mix water, sand, and cement for two (2) minutes; then add lime. Mix for ten (10) additional minutes. Mix to maintain a slump of from 22" inches to 3" inches. A continuous mortar mixer will not be permitted. Do not mix more mortar than can be used in thirty (30) minutes. Retempering, of mixture will not be allowed.

2.03 Grout Mixes:

A. General: Strength at seven (7) days shall be 1400 psi; strength at twenty-eight (28) days shall be 2000 psi.

B. Cement: Portland cement, Type 11, low alkali, shall conform to **ASTM C - 150** or a blended cement, Type IP, conforming to **ASTM C - 595**. The Pozzolan constituent shall not exceed 20%, by weight, of the blended cement and alkali content shall not exceed that allowed for Type II, low alkali, Portland cement. One brand of cement shall be used throughout the work. Cement shall have been used for at least two (2) years with the proposed aggregate without detrimental reaction.

C. Aggregates: Coarse and fine aggregate shall conform to **ASTM C - 404.** Aggregate size and blend as determined by the mix proportions.

D. Admixture: Sika product GROUT AID TYPE 11, or approved equal.

E. Slump: The maximum allowable grout slump shall not exceed that specified by the approved grout mix proportions nor nine (9) inch maximum.

F. Mixing: Use transit-mixed grout complying with **ASTM C - 94**. Transit-mixed grout shall be mixed for a period of not less than ten (10) minutes and at least three (3) minutes of the mixing period shall be immediately prior to discharging of the job. The introduction of additional water after initial mixing will not be permitted.

G. Finish: Split-Face, Natural Buff Color or as selected by project manager.

2.04 Reinforcing Steel:

Refer to Drawings.

2.05 Water:

A. Fresh, clean and potable, and free from such amount of mineral and organic substances as would adversely affect the hardening of cement mortar or grout.

PART 3 - EXECUTION

3.01 Surface Conditions:

A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Carefully coordinate with all other trades with the work of this Section.

B. Previously placed concrete or masonry shall be cleaned of encrustation, latence, oil, and coatings which would reduce the bond by sandblasting. Work shall be washed thoroughly with water under pressure. Surfaces shall be left damp where masonry units connect with work placed earlier.

C. In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been completely resolved.

3.02 Installation:

A. General: Lay up all walls in common bond, plumb, level, and true to the lines and dimensions indicated on the drawings. All cells shall be filled solid with grout. Lay up with exterior face in the true plane. Do not use chipped or broken units; if any such units are discovered in the finished wall, they shall be immediately removed and replaced with new units.

B. Dampening: Dampening or wetting of units prior to installation is not permitted.

C. Placement: Place all units in mortar with full shoved bed and head joints. Mortar joints shall be struck flush to receive plaster where shown. Joints shall be struck concave on exposed split face block. Align all vertical cells to maintain a clear, unobstructed system flues, with a minimum area of 2"x3". Hold racking to an absolute minimum. Toothing is not permitted. No part of any masonry shall be erected 6'-0" higher than adjoining portions. Fraction parts of masonry units shall not be used where the work can be completed using whole units. The chinking of interstices with fragments will not be allowed. Miter cut block at angled comers.

D. Reinforcement: Install all reinforcement as indicated on the Drawings. Center vertical reinforcement in the wall. Maintain minimum 3@ inch clearance between bar and masonry. Hold firmly in place by ties, anchors, or other approved methods. Fully embed reinforcement in grout, not in mortar or mortar joints. Install all required metal accessories to ensure accurate alignment of steel during grout placement. ***See drawings for other structural requirements.***

E. Tooling: Tool all exposed joints, interior and exterior, in concave pattern. Brush off excess mortar from split face units before mortar beings to dry.

3.03 Grout Placement:

A. General: The Architect must be notified at least 24 hours before placing of any grout. Before placing grout, mixing and conveying equipment shall be well-cleaned, space to be occupied by grout shall be thoroughly cleaned as required for the type of grouting operation selected. No grout shall be placed in any of work until all shoring has been completely constructed, all reinforcement has been secured in place, and all items to be built into masonry are in place.

B. Records: The Contractor shall be responsible for checking transit mix shipping tags. Obtain copies of transit mix trip tickets and maintain on-site for the Architect's review. Tickets shall be signed by a certified State of California Weighmaster. The following information shall be included on the tag:

1. Date.
.2. Design mix number.
3. Time of batching.
4. Time of arrival at the site.
5. Quantities of materials (including admixtures).
6. Amount of water added at the site, if any.

Maintain a complete up-to-date record of all lifts made on the project, including the date, amount and location of grout placed.

C. Workability: Grout shall be handled as rapidly as practicable from the mixer to the place of final deposit by methods which prevent the separation or loss of ingredients. It shall be deposited, as nearly as practicable, in its final position to avoid rehandling or flowing. Do not place retempered grout, grout that is partially hardened, or grout contaminated by form materials in the work.

D. Weather Requirements: Grout shall not be mixed or placed when the atmospheric temperature is below forty (40ᴺ) degrees F. Concrete masonry units which grout will contact must be completely free of frost. The grout and masonry must be kept at a temperature of not less than fifty (50ᴺ) degrees Fahrenheit for not less than seventy-two (72) hours after grout placement.

E. Vibration: All grout shall be re-consolidated by use of a flexible cable vibrator. Maintain on-site, in working condition, a standby vibrator. Grout shall be vibrated again after excess moisture has been absorbed by the concrete masonry units and prior to loss of plasticity. Excessive vibration, in order to mobilize the grout through segregation, will constitute a rejection of the work.

F. Method or Placement: Contractor shall use low lift grouting procedures to complete all masonry work.

G. Low Lift Grouting: Concrete masonry units shall be laid to a height not exceeding the grout lift. Low lift grouting shall not exceed 4'-0" in height. Terminate lift 2@ inch from top of concrete masonry units when additional courses are to be added. Place grout only after mortar has attained enough strength to contain the grouts' fluid pressure.

H. Tolerances: Maximum variation of installed adjacent units is 1/16" inch. Maximum variation from horizontal and vertical building lines is 3@ inch. Any masonry work that is not installed as indicated, not true to intended alignment, not plumb and level where so intended, not true to line or grade or does not fully conform to these specifications will be deemed defective. If so directed by the Architect, the defective work shall be removed from the job site and replaced with masonry complying with requirements of the specifications.

3.04 Field Quality Control:

A. Masonry Construction: Perform all masonry construction in the presence of the Special Inspector.

3.05 Cleaning-up:

A. Upon completion of the work of this section, make a thorough inspection of all installed concrete unit masonry and verify that all units and all joints have been installed in accordance with the provisions of the Section. Make all necessary adjustments.

B. Clean all surfaces of concrete unit masonry as required for proper application of the specified finishes. Use of acidic solution as a cleaning agent is not acceptable.

C. Upon completion of all work of the Section, promptly remove from the job site all mortar droppings, broken units, debris arising from the work of the Section, masonry sample panel and all tools and equipment of this Section, leaving all areas in a neat and orderly condition to the approval of the Architect.

END OF SECTION

SECTION 07131 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Modified bituminous sheet waterproofing, fabric reinforced.
   2. Molded-sheet drainage panels.

B. Related Sections include the following:
   1. Division 7 Section "Joint Sealants" for joint-sealant materials and installation.

1.3 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

C. Samples: For the following products:
   1. 12-by-12-inch square of waterproofing and flashing sheet.
   2. 4-by-4-inch square of drainage panel.

D. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

E. Qualification Data: For Installer.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for waterproofing.

G. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A firm that is acceptable to waterproofing manufacturer for installation of waterproofing required for this Project.

B. Source Limitations: Obtain waterproofing materials, protection course, and molded-sheet drainage panels through one source from a single manufacturer.

C. Preinstallation Conference: Conduct conference at Project site.
   1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.

C. Remove and replace liquid materials that cannot be applied within their stated shelf life.

D. Store rolls according to manufacturer's written instructions.

E. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
   1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.7 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to replace waterproofing material that does not comply with requirements or that fails to remain watertight within specified warranty period.
   1. Failure includes, but is not limited to, failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate exceeding 1/16 inch in width.
   2. Warranty Period: Five years.

B. Special Installer's Warranty: Specified form, on warranty form at end of this Section, signed by Installer, covering Work of this Section, for warranty period of two years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Modified bituminous Sheet: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified.
   1. Bituthene 3000 by Grace. (Basis of Design)
   2. VM 75 by American Hydrotech, Inc.
   3. CCW MiraDRI 860/861 by Carlisle Coatings & Waterproofing Inc.
   4. SealTight Mel-Rol by Meadows, W. R., Inc.
   5. Or equal.

B. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panels: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified.
   1. Hydroduct 220 by Grace. (Basis of Design)
   2. Hydrodrain 400 by American Hydrotech.
   3. CCW MiraDRAIN 6200 by Carlisle.
   4. Or equal.

C. Perimeter Drain: Subject to compliance with requirements, provide either the named product or an equal product by one of the other manufacturers specified.
   1. Hydroduct Coil 600 by Grace. (Basis of Design)
   2. Or equal.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet: 60-mil- thick, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated to a 4-mil- thick, polyethylene film with release liner on adhesive side and formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
   1. Physical Properties:
      a. Tensile Strength: 250 psi minimum; ASTM D 412, Die C, modified.
      b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
      c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970.
      d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836.
      e. Puncture Resistance: 40 lbf minimum; ASTM E 154.
      f. Hydrostatic-Head Resistance: 150 feet minimum; ASTM D 5385.
      g. Water Absorption: 0.15 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
      h. Vapor Permeance: 0.05 perms; ASTM E 96, Water Method.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne primer recommended for substrate by manufacturer of sheet waterproofing material.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, asphalt-modified coating.

F. Sheet Strips: Self-adhering, rubberized-asphalt sheet strips of same material and thickness as sheet waterproofing.

G. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

H. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch thick, predrilled at 9-inch centers.

2.4 MOLDED-SHEET DRAINAGE PANELS

A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side with or without a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core, with a vertical flow rate of 9 to 15 gpm per ft.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
   1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
   2. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

F. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
   1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:
      a. At footing-to-wall intersections, extend liquid membrane each direction from corner or install membrane strip centered over corner.
      b. At plaza deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.

G. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET WATERPROOFING APPLICATION

A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and according to recommendations in ASTM D 6135.

B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.
   1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

D. Apply continuous sheets over sheet strips bridging substrate cracks, construction, and contraction joints.

E. Seal exposed edges of sheets at terminations not concealed by metal counterflashings or ending in reglets with mastic.

F. Install sheet waterproofing and auxiliary materials to tie into adjacent waterproofing.

G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

H. Install protection course with butted joints over waterproofing membrane immediately.
   1. Molded-sheet drainage panels may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.

I. Correct deficiencies in or remove sheet waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

3.4 MODIFIED BITUMINOUS COMPOSITE PANEL WATERPROOFING APPLICATION

A. Install modified bituminous composite panels according to waterproofing manufacturer's written instructions.

B. Apply primer to substrate at required rate and allow to dry. Limit priming to areas that will be covered by waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Install and firmly adhere composite panels over area to receive waterproofing. Accurately align and butt vertical and horizontal joints.

D. Seal vertical and horizontal butt joints and exposed top, side, and bottom edges at composite panel waterproofing terminations with detail strips.

E. Correct deficiencies in or remove composite panel waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair detail strips.

3.5 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesives that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.6 FIELD QUALITY CONTROL

A. Engage a full-time site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions; surface preparation; membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.

3.7 PROTECTION AND CLEANING

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.8 WATERPROOFING INSTALLER'S WARRANTY

A. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Waterproofing Installer," has performed waterproofing and associated work ("work") on the following project:
1. Owner: <Insert name of Owner.>
2. Address: <Insert address.>
3. Building Name/Type: <**Insert information.**>
4. Address: <Insert address.>
5. Area of Work: <Insert information.>
6. Acceptance Date: <**Insert date.**>
7. Warranty Period: <**Insert time.**>
8. Expiration Date: <**Insert date.**>

B. AND WHEREAS Waterproofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Waterproofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
    a. lightning;
    b. peak gust wind speed exceeding 90 mph;
    c. fire;
    d. failure of waterproofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    f. vapor condensation on bottom of waterproofing; and
    g. activity on waterproofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Waterproofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Waterproofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Waterproofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent

said alterations affect work covered by this Warranty. If Owner engages Waterproofing Installer to perform said alterations, Warranty shall not become null and void unless Waterproofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Waterproofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Waterproofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Waterproofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of waterproofing failure. Specifically, this Warranty shall not operate to relieve Waterproofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <**Insert day**> day of <**Insert month**>, <**Insert year**>.
   1. Authorized Signature: <**Insert signature.**>
   2. Name: <Insert name.>
   3. Title: <Insert title.>

END OF SECTION 07131

SECTION 09 91 13
PAINTING

PART 1 – GENERAL

1.01 DESCRIPTION: Division 1 applies to this section. Provide and perform painting, complete.

A. Work In This Section: Principal items include:
   1. Preparation of surfaces.
   2. Painting of interior surfaces, except as otherwise specified.
   3. Painting of exterior surfaces, except as otherwise specified.

B. Related Work Not In This Section:
   1. Shop prime coats and factory finishes.
   2. Painting specified as work of other sections.
   3. Caulking and sealants.

C. Surfaces Not To Be Painted:
   1. Non-ferrous metal work (other than zinc-coated surfaces) and plated metal, unless particular items are specified to be painted.
   2. Stone surfaces.
   3. Exterior concrete walls and surfaces unless particular items are specified to be painted.
   4. Surfaces concealed in walls and above solid ceilings.
   5. Non-metallic walking surfaces unless specifically shown or specified to be painted.
   6. Factory finished surfaces.
   7. Ceramic tile and plastic surfaces.
   8. Resilient base.
   9. Galvanized fencing.
   10. Galvanized gratings.
   11. Surfaces indicated not to be painted.
   12. Surfaces specified to be finish painted under other sections.

1.02 COMPLIANCE WITH REGULATIONS: All materials shall comply with the current rules and regulations of the local air quality management district, with the rules regarding volatile organic compounds, and with FDA rules and regulations for dangerous materials in paint.

1.03 SUBMITTALS:

A. List of Paint Materials: Prior to submittal of samples, submit a complete list of proposed paint materials, identifying each material by manufacturer's name, product name and number, including primers, thinners, and coloring agents, together with manufacturers' catalog data fully describing each material as to contents, recommended usage, and preparation and application methods. Identify surfaces to receive various paint materials. Do not deviate from approved list.

B. Color Samples: Prior to preparing samples, obtain color and gloss selections and instructions. Using materials from approved list, prepare and submit 8-1/2" by 11" samples of each complete opaque paint finish.
C. Natural or Stain Finish Samples: Prepare samples on 1 2" squares of the same species and appearance of wood as used in the work.
D. Job Samples: Apply minimum 100 square foot samples on site, on actual surfaces to be finished with each material, color, and gloss, in locations as directed. Prime and intermediate coats shall extend one foot beyond finish coat on each sample in at least 2 directions. Obtain approval of each sample prior to proceeding with the work. Leave the samples in place, with removable tags, until completion of the work. All work shall match approved samples.
E. Certificates: Submit certificate showing that all products meet the requirements of paragraph "Compliance with Regulations" above.

1.04 JOB CONDITIONS:

A. Protection: Protect all painting while in progress and cover and protect adjoining surfaces and property of others from damage. Exercise care to prevent paint from contacting surfaces not to be painted. During painting of exterior work, cover windows, doors, concrete, and other surfaces not to be painted.
B. Examination of Surfaces: Examine surfaces to be painted or finished under this Section and verify satisfactory condition. Unsatisfactory conditions shall be corrected before application of the first coat of paint.
C. Weather Conditions: Apply paint to clean, dry, prepared surfaces. Do not apply exterior paint during rainy, damp, foggy, or excessively hot and/or windy weather. Arrange for temporary heat and ventilation for interior painting.
D. Precaution: Place rags and waste in self-closing metal containers, removed from site at the end of each day. Do not let rags and waste accumulate.

1.05 EXTRA STOCK:

A. Provide a one-gallon container of each paint color and surface texture to Owner at acceptance.
B. Label each container with color, texture, and original application locations, in addition to the manufacturer's label.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

Dunn-Edwards Corp. (Basis of Design)
4885 E. 52nd Place
Los Angeles CA, 90058
(323) 771-3330

Benjamin Moore & Co.
51 Chestnut Ridge Road
Montvale NJ 07645
(888) 236-6667

Vista Paint Corporation
2020 Orangethorpe Avenue, Suite 210
Fullerton CA 92831
(323) 397-9000
FAX (323) 883-0273

The Sherwin Williams Company, Inc.
101 W. Prospect Ave.
Cleveland, OH 44115
(215) 566-2000

PART 3 - EXECUTION

3.01 WORKMANSHIP: Apply painting materials in accordance with manufacturer's instructions by brush or roller; spray painting is not allowed without specific approval in each case unless noted otherwise. For this project, spray painting and backrolling is acceptable at exterior walls and exterior ceilings. Apply each coat at the proper consistency, free of brush or roller marks, sags, runs, or other evidence of poor workmanship. Do not lap paint on glass, hardware, and other surfaces not to be painted; apply masking as required. Sand between enamel coats. Apply painting materials in accordance with manufacturer's

3.02 PREPARATION OF SURFACES: Properly prepare surfaces to receive finishes.

A. Concrete: Fill cracks, holes, and other blemishes with Portland cement patching plaster or a stiff paste mixed of finish paint and fine sand, finished to match adjoining surfaces. Remove glaze by sanding, wire brushing, or light brush-off sandblasting. Neutralize all alkali conditions according to the paint manufacturer's directions. Dry surfaces to receive breathing type latex paints at least two weeks, free of visible moisture. Dry the surfaces to receive oil, alkyd, or epoxy-based paint until the moisture content does not exceed 8% when tested with an electronic moisture-measuring instrument.
B. Masonry: Repair minor holes and cracks with a stiff paste of finish paint and fine sand or vinyl type block filler. Report major or unsightly defects for correction. Neutralize all alkali and efflorescence according to paint manufacturer's directions and allow to dry.
C. Exterior Plaster: Fill hairline cracks with Portland cement patching material; report larger cracks for correction. Test and ensure plaster is sufficiently dry to receive the paint finish.
D. Gypsum Wallboard: Touch-up minor defects with spackle and sand smooth and flush. Report other defects as specified. Verify that skim coat specified in Section 09250 is properly applied. If not, apply one heavy coat of skim coat material specified in Section 09250, over entire surface by brush or roller.

E. Shop Coated Metal: Degrease and clean of foreign matter. Clean and spot prime field connections, welds, soldered joints, burned, or abraded portions with same material used in shop coats. After complete hardening, sand entire surfaces for coat to follow.
F. Uncoated Ferrous Metal: Degrease and clean of dirt, rust, mill scale, and all other foreign matter using power tool rotary brushes to achieve a clean surface consistent with SSPC-SP3. Remove pits and welding slag, and clean surfaces to bright metal before priming. Apply metal primer not more than three hours after preparation.
G. Galvanized Metal: Eliminate contaminants and stabilize zinc film by solvent wiping or sweep blasting, as appropriate, followed by not less than one coat of wash primer of type specified in Paint Schedule hereafter, to provide suitable surface for finish painting. Allow to dry. Prepare a representative surface, not smaller than 24" square, or 36" by length of section, as applicable, and obtain approval prior to proceeding.
    1. Solvent wiping: Remove oil and grease with rags or brushes saturated in trisodium phosphate or similar alkaline detergent. For heavier soil, use MEK, or equivalent proprietary cleaner. Do not use vinegar or acetic acid.
    2. Sweep blasting: Use aluminum/magnesium silicate, limestone or other non-metallic blast media to expose pure zinc.
    3. Wash primer: Spray apply one coat of specified wash primer after other preparation is complete, to thickness of 0.5 mils. Allow to dry 60 minutes and apply top coating in not more than 4 hours, If this time is exceeded for any reason, reapply wash primer prior to applying finish paint.
H. Enameled Woodwork: Remove handling marks and effects of exposure to moisture with a thorough sanding overall surfaces of the exposed portions, using at least 150 grit of finer sandpaper and thoroughly clean all surfaces before applying sealer. After priming, putty nail holes, cracks, or other defects with putty matching color of finish paint. Cover knots and sappy areas with shellac or approved knot sealer. Sand each base coat smooth when dry.
I. Transparent Finished Woodwork: Remove handling marks and effects of exposure to moisture with a thorough sanding parallel to the grain of the wood, over all surfaces of the exposed portions, including interiors of cases and drawers, using at least 150 grit or finer sandpaper and thoroughly clean all surfaces before applying sealer. Repair all defects with filler tinted to match stain or wood color, as required, after first coat of sanding sealer and remove all smears.
J. Fixtures, Equipment, and Hardware Items: Coordinate with the work of other sections, and coordinate removal of fixtures, equipment, and hardware as required to perform painting. Items to be removed include, without limitation: signs and graphics; switch and receptacle plates; escutcheons and plates; all surface-mounted equipment; free-standing equipment blocking access; grilles and louvers at ducts opening into finished spaces; and other items as required and directed. Surfaces Not Mentioned: Prepare surfaces according to recommendations of the paint manufacturer and as approved.
K. Surfaces Not Mentioned: Prepare surfaces according to recommendations of the paint manufacturer and as approved.
L. Moisture Content: Measure moisture at surfaces using an electronic moisture meter.

M. Do not apply finishes unless moisture is below the following maximums:
   1. Exterior Plaster and Concrete: 15 percent
   2. Exterior Wood: 19 percent
   3. Interior Gypsum Wallboard: 12 percent Interior Wood:4. 1 5 percent measured in accordance with ASTM D2016

3.03 COATS: The number of paint coats specified to be applied are minimum. Apply additional coats if required to obtain complete hiding and approved results. Ensure acceptable paint finishes of uniform color, free from cloudy or mottled areas and evident thinness on arises. "Spot" or undercoat surfaces as necessary to produce such results. Tint each coat a slightly different shade of finish color to permit identification. Conform to the approved Samples. Obtain approval of each coat before applying next coat; otherwise, apply an additional coat over entire surface involved at no additional contract cost.

3.04 COLORS: The numbers given in the following schedule indicate the types of paints required for each surface, identified by their number in white. The actual paint to be applied on each surface shall be the same material in the color or colors as selected, and as approved on submitted samples. Allow for the use of several colors in each room or space, and for doors, frames, dadoes, trim and other items to be finished in different colors.

3.05 DEGREE OF GLOSS: Degrees of gloss shown on drawings and herein specified are approximate only. The exact degree of gloss required for each surface will be determined. Materials shall meet the following requirements for degree of gloss, when tested according to ASTM D523, using Gardner Laboratory 60-degree gloss meter after 14 days.

NOMENCLATURE	**PERCENTAGE OF GLOSS**
FLAT	LESS THAN 10
SUEDE OR EGGSHELL	25 – 55
SATIN OR SEMI-GLOSS	55 – 70
GLOSS OR HIGH GLOSS	MORE THAN 70

3.06 MISCELLANEOUS PAINTING:

A. Fire Extinguisher and Fire Hose Cabinets and Fire Alarm Bells: Apply 2 coats of paint finish, inside and out, matching finish and color of adjoining areas, unless otherwise noted or directed.
B. Weatherstripping and Sound Seals. Paint exposed metal surfaces to match the door frame, whether or not unfinished, furnished with factory prime coat, or factory treated for paint adhesion.
C. Doors: Seal top and bottom edges after cleaning with coat of primer. Where the faces of the doors differ in color or finish, finish the edges to match the face visible when the door is open. Coat cutouts for hinges, edges of lockset holes and strikes same as for first coat.
D. Access doors and panels: Generally, paint same color as surrounding walls and ceiling.

E. Louvers and glazed frames in wood and metal doors: Unless otherwise directed, paint 3 coats, colors to match doors.
F. Door Trim and Prime Coated Hinges: Paint trim to match door and paint hinges to match frame only where hinges are currently painted. Do not paint unfinished hinges.
G. Speaker Grilles: Paint to match surrounding surfaces unless specified otherwise.
H. Miscellaneous. For any items not specifically indicated or specified that require a paint finish, apply 3 coats of paint as directed.

3.07 CLEANING AND TOUCH-UP WORK. Make a detailed inspection of paint finishes after all painting is completed, remove spattering of paint from the adjoining surfaces, and make good all damage that may be caused by cleaning operations. Carefully touch-up all abraded, stained, or otherwise disfigured painting, as approved, and leave entire painting in first-class condition.

PAINT SCHEDULES

TABLE 1
EXTERIOR PAINTING SCHEULE

* TYPICAL SCOPE FOR ALL EXISTING PAINTED SURFACES IN THE PROJECT: SPOT PRIME WHERE NEEDED & APPLY (2) COATS OF PAINT PER TABLE BELOW. TYPCIAL SCOPE FOR ALL EXISTING UNPAINTED SURACES: PRIME & APPLY (2) COATS OF PAINT PER TABLE BELOW.

SURFACE, COATS	DUNN-EDWARDS	BENJAMIN MOORE	VISTA PAINT	SHERWIN WILLIAMS
PLASTER & CONCRETE (100% ACRYLIC EGGSHELL/SATIN)				
FIRST COAT	ESPR00 - EFF-STOP PREMIUM	N023 FRESH START PRIMER	4600 UNIPRIME	LOXON LX02W0050
SECOND COAT	EVSH10 - EVERSHIELD10	631 AURA SATIN	2000 DURATONE	SUPERPAINT SATIN A89
THIRD COAT	EVSH10 - EVERSHIELD10	631 AURA SATIN	2000 DURATONE	SUPERPAINT SATIN A89
CONC. UNIT MASONRY (100% ACRYLIC EGGSHELL/SATIN)				
FIRST COAT	SBSL00-SMOOTHBLOC-FIL SELECT	571 LATEX BLOCK FILL	040 BLOCK KOTE	HVY DUTY FILLER B42W46
SECOND COAT	EVSH10 - EVERSHIELD10	631 AURA SATIN	2000 DURATONE	SUPERPAINT SATIN A89
THIRD COAT	EVSH10 - EVERSHIELD10	631 AURA SATIN	2000 DURATONE	SUPERPAINT SATIN A89
FERROUS METAL ALKYD URETHNE SEMIGLOS ENAMEL				
FIRST COAT	BRPR00-BLOC-RUST PREMIUM	OR EQUAL FROM OTHER MFRS	9600 PROTEC METAL PRIME	PROCRYL PRIMER B66 SERIES
SECOND COAT	ASHL50 - ARISTOSHIELD50		9800 PROTEC SEMIGLOSS	PI WB ALKYD URETHANE B53
THIRD COAT	ASHL50 - ARISTOSHIELD50		9800 PROTEC SEMIGLOSS	PI WB ALKYD URETHANE B53
GALVANIZED METAL, ALKYD URETHNE SEMIGLOS ENAMEL				
PRETREAT	SC-ME01 - KRUD KUTTER METAL CLEAN AND ETCH	OR EQUAL FROM OTHER MFRS	JASCO PREP N'PRIME	DTM WASH PRIMER
FIRST COAT	UGPR00 - ULTRAGRIP PREMIUM		9600 PROTEC METAL PRIME	PROCRYL PRIMER B66 SERIES
SECOND COAT	ASHL50 - ARISTOSHIELD50		9800 PROTEC SEMIGLOSS	PI WB ALKYD URETHANE B53
THIRD COAT	ASHL50 - ARISTOSHIELD50		9800 PROTEC SEMIGLOSS	PI WB ALKYD URETHANE B53
WOOD - PAINTED, 100% ACRYLIC SEMI-GLOSS ENAMEL				
FIRST COAT	EZPR00 - E-Z PRIME PREMIUM	N023 FRESH START PRIMER	4200 TERMINATOR	PREPRITE PROBLOCK B51
SECOND COAT	ASHL50 - ARISTOSHIELD50	W096 MOORGLO	8400 CAREFREE	SOLO A76 SERIES
THIRD COAT	ASHL50 - ARISTOSHIELD50	W096 MOORGLO	8400 CAREFREE	SOLO A76 SERIES
WOOD, SEMI-TRANSPARENT STAIN				
FIRST COAT				
SECOND COAT (IF REQ'D)	CABOT STAIN SEMI-SOLID	C329 SEMI-SOLID STAIN	OLYMPIC ST STAIN	WOODSCAPES A15T5
		C329 SEMI-SOLID STAIN	OLYMPIC ST STAIN	WOODSCAPES A15T5

TABLE 2
INTERIOR ENAMEL MATERIALS

SURFACE, COATS	DUNN-EDWARDS	BENJAMIN MOORE	VISTA PAINT	SHERWIN WILLIAMS
100% ACRYLIC FINISH, GLOSS	SWLL50 SPARTAWALL60	309 IMPERVEX	8500 CAREFREE	SOLO A77 GLOSS SERIES
100% ACRYLIC FINISH, SEMI-GLOSS WALLS AND CEILINGS ONLY NON-BLICKING, FOR DOORS AND WINDOWS	W6160E VERBAGLO SWLL50 SPARTAWALL60	276 MOORCRAFT 333 REGAL AQUAGLO	7000 ACRIGLO 8400 CAREFREE	SOLO A76 SEMI-GLOSS SERIES
100% ACRYLIC FINISH, EGGSHELL	W6Z50E VERSASATIN	277 SUPER SPEC PEARL	1700 COVERALL	SOLO EGGSHELL A75 SERIES

TABLE 3
INTERIOR PAINTING SCHEDULE

SURFACE, COATS	DUNN-EDWARDS	BENJAMIN MOORE	VISTA PAINT	SHERWIN WILLIAMS
WOOD, SEMI-TRANSPARENT STAIN	SWLL50 SPARTAWALL60	215 REGAL WALL SATIN	8100 CAREFREE	PROMAR 200HP EGGSHELL B20-1900
FIRST COAT	SWLL50 SPARTAWALL60	215 REGAL WALL SATIN	8100 CAREFREE	
SECOND COAT				PROMAR 200HP EGGSHELL B20-1900
CONCRETE UNIT MASONRY, ACRYLIC FLAT FINISH	SB5L00 - SMOOTH BLOCK-FIL SELECT	205 BLOCK FILLER	040 BLOCK KOTE	BLOCK FILLER B42W46
FIRST COAT		215 REGAL WALL SATIN	8100 CAREFREE	PROMAR 200HP EGGSHELL B20-1900
SECOND COAT	ENAMEL FINISH	215 REGAL WALL SATIN	8100 CAREFREE	
THIRD COAT	ENAMEL FINISH			PROMAR 200HP EGGSHELL B20-1900
GYPSUM BOARD, ENAMEL FINISH				PROMAR 200 B28W2600
FIRST COAT	VNSL00 - VINYLASTIC SELECT	216 FIRST COAT	110 HI BUILD SEALER	PROMAR 200HP EGGSHELL B20-1900
SECOND COAT	ENAMEL FINISH	ENAMEL FINISH	ENAMEL FINISH	
THIRD COAT	ENAMEL FINISH	ENAMEL FINISH	ENAMEL FINISH	PROMAR 200HP EGGSHELL B20-1900
WOOD, ENAMEL FINISH				
FIRST COAT	BIPR00 - BLOCK-IT PREMIUM	023 FRESH START	188 ACRYLIC UNDERCOATER	PREPRITE B51 SERIES
SECOND COAT	ENAMEL FINISH	ENAMEL FINISH	ENAMEL FINISH	SOLO A76 SERIES
THIRD COAT	ENAMEL FINISH	ENAMEL FINISH	ENAMEL FINISH	SOLO A76 SERIES
WOOD, SATIN CLEAR VARNISH 3 COATS	MCCLOSKEY'S 6701	C435 BENWOOD LOW LUSTER	DEFTHANE SATIN CLEAR	MINWAX WATERBASE SPARURETHANE SATIN
FERROUS METAL, ENAMEL FINISH				
FIRST COAT	UGPR00 - ULTRA-GRIP PREMIUM	MO4ACRYLIC METAL RIMER	4800 METAL PRO	PROCRYL PRIMER B66 SERIES
SECOND COAT	ENAMEL FINISH	ENAMEL FINISH	ENAMEL FINISH	PI WB ALKYD URETHANE B53
THIRD COAT	ENAMEL FINISH	ENAMEL FINISH	ENAMEL FINISH	PI WB ALKYD URETHANE B53
GALVANISED METAL, ENAMEL FINISH				
PRETREAT	SC-ME01 - KRUD KUTTER METAL	JASCO PREP N'PRIME	JASCO PREP N'PRIME	DTM WASH PRIMER
FIRST COAT	CLEAN & ETCH	MO4 ACRYLIC METAL PRIMER	4800 METAL PRO	PROCRYL PRIMER B66 SERIES
SECOND COAT	UGPR00 - ULTRA-GRIP PREMIUM	ENAMEL FINISH	ENAMEL FINISH	PI WB ALKYD URETHANE B53
THIRD COAT		ENAMEL FINISH	ENAMEL FINISH	PI WB ALKYD URETHANE B53

END OF SECTION

SECTION 260519 - LOW-VOLTAGE POWER CONDUCTORS AND CABLES

PART 1 - GENERAL ELECTRICAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Field quality-control test reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.

C. Copper Conductors: Comply with NEMA WC 70.

D. Conductor Insulation: Comply with NEMA WC 70 for Types THW, THHN-THWN, and XHHW.

2.2 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.

4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

I. Class 1 Control Circuits: Type THHN-THWN, in raceway.

J. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections and prepare test reports.

C. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.

    a. Uninterruptible power supply system.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.

    a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
    b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

D. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Grounding systems and equipment.

B. Section includes grounding systems and equipment, plus the following special applications:

1. Underground distribution grounding.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:

1. Test wells.
2. Ground rods.
3. Ground rings.
4. Grounding arrangements and connections for separately derived systems.
5. Grounding for sensitive electronic equipment.

B. Qualification Data: For qualified testing agency and testing agency's field supervisor.

C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Instructions for periodic testing and inspection of grounding features at grounding connections for separately derived systems based on NFPA 70B

a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
b. Include recommended testing intervals.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel, sectional type; 3/4 inch by 10 feet (19 mm by 3 m) in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 2 inches (50 mm) minimum from wall, 6 inches (150 mm) above finished floor unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down to specified height above floor; connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches (100 mm) will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway

with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

G. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.

1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-12-inch (6.3-by-100-by-300-mm) grounding bus.
3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

H. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways

for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.

1. Test Wells: Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

G. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

H. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of building.

1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.
2. Bury ground ring not less than 24 inches (600 mm) from building's foundation.

I. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70; use a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 3/0 AWG.

1. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within base of foundation.
2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

3.5 LABELING

A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for instruction signs. The label or its text shall be green.

B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.

1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

E. Grounding system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

G. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).

H. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Conduit, ducts, and duct accessories for direct-buried and concrete-encased duct banks, and in single duct runs.
2. Handholes and boxes.

1.3 DEFINITION

A. RNC: Rigid nonmetallic conduit.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Duct-bank materials, including separators and miscellaneous components.
2. Ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Accessories for manholes, handholes, boxes, and other utility structures.
4. Warning tape.
5. Warning planks.

B. Shop Drawings for Factory-Fabricated Handholes and Boxes Other Than Precast Concrete: Include dimensioned plans, sections, and elevations, and fabrication and installation details, including the following:

1. Duct entry provisions, including locations and duct sizes.
2. Cover design.
3. Grounding details.

4. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

1.5 INFORMATIONAL SUBMITTALS

A. Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.

1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
2. Drawings shall be signed and sealed by a qualified professional engineer.

B. Product Certificates: For concrete and steel used in precast concrete handholes, as required by ASTM C 858.

C. Qualification Data: For professional engineer and testing agency.

D. Source quality-control test reports.

E. Field quality-control test reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Comply with ANSI C2.

C. Comply with NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver ducts to Project site with ends capped. Store nonmetallic ducts with supports to prevent bending, warping, and deforming.

B. Store precast concrete and other factory-fabricated underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.

C. Lift and support precast concrete units only at designated lifting or supporting points.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Architect and Owner no fewer than seven days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Owner's written permission.

1.9 COORDINATION

A. Coordinate layout and installation of ducts, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field.

B. Coordinate elevations of ducts and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that duct runs drain to manholes and handholes, and as approved by Architect.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Furnish cable-support stanchions, arms, insulators, and associated fasteners in quantities equal to 5 percent of quantity of each item installed.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1.

B. RNC: NEMA TC 2, Type EPC-40-PVC and Type EPC-80-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

2.2 NONMETALLIC DUCTS AND DUCT ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

1. ARNCO Corp.
2. Beck Manufacturing.
3. Cantex, Inc.
4. CertainTeed Corp.; Pipe & Plastics Group.
5. Condux International, Inc.
6. ElecSys, Inc.
7. Electri-Flex Company.
8. IPEX Inc.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT; a division of Cable Design Technologies.
11. Spiraduct/AFC Cable Systems, Inc.

C. Duct Accessories:

1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and sizes of ducts with which used, and selected to provide minimum duct spacings indicated while supporting ducts during concreting or backfilling.
2. Warning Tape: Underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."
3. Concrete Warning Planks: Nominal 12 by 24 by 3 inches (300 by 600 by 76 mm) in size, manufactured from 6000-psi (41-MPa) concrete.

    a. Color: Red dye added to concrete during batching.
    b. Mark each plank with "ELECTRIC" in 2-inch- (50-mm-) high, 3/8-inch- (10-mm-) deep letters.

2.3 PRECAST CONCRETE HANDHOLES AND BOXES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Christy Concrete Products.

2. Oldcastle Precast Group.
3. Riverton Concrete Products; a division of Cretex Companies, Inc.
4. Utility Concrete Products, LLC.

C. Comply with ASTM C 858 for design and manufacturing processes.

D. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole or box.

1. Frame and Cover: Weatherproof steel frame, with hinged steel access door assembly with tamper-resistant, captive, cover-securing bolts.

    a. Cover Hinges: Concealed, with hold-open ratchet assembly.
    b. Cover Handle: Recessed.

2. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
3. Cover Legend: Molded lettering, As indicated for each service.
4. Configuration: Units shall be designed for flush burial and have integral closed bottom, unless otherwise indicated.
5. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.

    a. Extension shall provide increased depth of 12 inches (300 mm).
    b. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.

6. Windows: Precast openings in walls, arranged to match dimensions and elevations of approaching ducts and duct banks plus an additional 12 inches (300 mm) vertically and horizontally to accommodate alignment variations.

    a. Windows shall be located no less than 6 inches (150 mm) from interior surfaces of walls, floors, or frames and covers of handholes, but close enough to corners to facilitate racking of cables on walls.
    b. Window opening shall have cast-in-place, welded wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct banks.
    c. Window openings shall be framed with at least two additional No. 4 steel reinforcing bars in concrete around each opening.

7. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.

a. Type and size shall match fittings to duct or conduit to be terminated.
b. Fittings shall align with elevations of approaching ducts and be located near interior corners of handholes to facilitate racking of cable.

8. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.4 SOURCE QUALITY CONTROL

A. Test and inspect precast concrete utility structures according to ASTM C 1037.

B. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of manholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by a independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or the manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 UNDERGROUND DUCT APPLICATION

A. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-80-PVC, in direct-buried duct bank, unless otherwise indicated.

B. Ducts for Electrical Branch Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank, unless otherwise indicated.

C. Underground Ducts for Telephone, Communications, or Data Utility Service Cables: RNC, NEMA Type EPC-40-PVC, installed in direct-buried duct bank, unless otherwise indicated.

D. Underground Ducts for Telephone, Communications, or Data Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank, unless otherwise indicated.

3.2 UNDERGROUND ENCLOSURE APPLICATION

A. Handholes and Boxes for 600 V and Less, Including Telephone, Communications, and Data Wiring:

1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, H-20 structural load rating.
2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-20 structural load rating.
3. Units in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Precast concrete, AASHTO HB 17, H-10 structural load rating.
4. Units Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf (13 345-N) vertical loading.

3.3 EARTHWORK

A. Excavation and Backfill: Comply with Section 312000 "Earthwork," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching.

D. Cut and patch existing pavement in the path of underground ducts and utility structures according to Section 017329 "Cutting and Patching."

3.4 DUCT INSTALLATION

A. Slope: Pitch ducts a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope ducts from a high point in runs between two manholes to drain in both directions.

B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches (1220 mm), both horizontally and vertically, at other locations, unless otherwise indicated.

C. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.

D. Duct Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches (250 mm) o.c. for 5-inch (125-mm) ducts, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet (3 m) from the end bell without reducing duct line slope and without forming a trap in the line.
2. Direct-Buried Duct Banks: Install an expansion and deflection fitting in each conduit in the area of disturbed earth adjacent to manhole or handhole.
3. Grout end bells into structure walls from both sides to provide watertight entrances.

E. Building Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 10 feet (3 m) outside the building wall without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition.

F. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig (1.03-MPa) hydrostatic pressure.

G. Pulling Cord: Install 100-lbf- (445-N-) test nylon cord in ducts, including spares.

H. Direct-Buried Duct Banks:

1. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.
2. Space separators close enough to prevent sagging and deforming of ducts, with not less than 5 spacers per 20 feet (6 m) of duct. Secure separators to earth and to ducts to prevent displacement during backfill and yet permit linear duct movement due to expansion and contraction as temperature changes. Stagger spacers approximately 6 inches (150 mm) between tiers.
3. Excavate trench bottom to provide firm and uniform support for duct bank. Prepare trench bottoms as specified in Section 312000 "Earthwork" for pipes less than 6 inches (150 mm) in nominal diameter.
4. Install backfill as specified in Section 312000 "Earthwork."
5. After installing first tier of ducts, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand-place backfill to 4 inches (100 mm) over ducts and hand tamp.

Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earthwork."

6. Install ducts with a minimum of 3 inches (75 mm) between ducts for like services and 6 inches (150 mm) between power and signal ducts.
7. Depth: Install top of duct bank at least 36 inches (900 mm) below finished grade, unless otherwise indicated.
8. Set elevation of bottom of duct bank below the frost line.
9. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
10. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    b. For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

11. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried ducts and duct banks, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of duct bank. Provide an additional plank for each 12-inch (300-mm) increment of duct-bank width over a nominal 18 inches (450 mm). Space additional planks 12 inches (300 mm) apart, horizontally.

3.5 INSTALLATION OF CONCRETE MANHOLES, HANDHOLES, AND BOXES

A. Precast Concrete Handhole and Manhole Installation:

1. Comply with ASTM C 891, unless otherwise indicated.
2. Install units level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances.
3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch (25-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

B. Elevations:

1. Install handholes with bottom below the frost line.

2. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.
3. Where indicated, cast handhole cover frame integrally with handhole structure.

C. Drainage: Install drains in bottom of manholes where indicated. Coordinate with drainage provisions indicated.

D. Waterproofing: Apply waterproofing to exterior surfaces of manholes and handholes after concrete has cured at least three days. After ducts have been connected and grouted, and before backfilling, waterproof joints and connections and touch up abrasions and scars. Waterproof exterior of manhole chimneys after mortar has cured at least three days.

E. Dampproofing: Apply dampproofing to exterior surfaces of manholes and handholes after concrete has cured at least three days. After ducts have been connected and grouted, and before backfilling, dampproof joints and connections and touch up abrasions and scars. Dampproof exterior of manhole chimneys after mortar has cured at least three days.

F. Hardware: Install removable hardware, including pulling eyes, cable stanchions, and cable arms, and insulators, as required for installation and support of cables and conductors and as indicated.

G. Field-Installed Bolting Anchors in Manholes and Concrete Handholes: Do not drill deeper than 3-7/8 inches (98 mm) for manholes and 2 inches (50 mm) for handholes, for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.

3.6 GROUNDING

A. Ground underground ducts and utility structures according to Section 260526 "Grounding and Bonding for Electrical Systems."

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
2. Pull aluminum or wood test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.

3. Test manhole and handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.8 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

B. Clean internal surfaces of manholes, including sump. Remove foreign material.

END OF SECTION 260543

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.3 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.4 FLOOR MARKING TAPE

A. 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.5 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

C. Tag: Type IID:

1. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
2. Overall Thickness: 8 mils (0.2 mm).
3. Foil Core Thickness: 0.35 mil (0.00889 mm).

4. Weight: 34 lb/1000 sq. ft. (16.6 kg/100 sq. m).
5. 3-Inch (75-mm)Tensile According to ASTM D 882: 300 lbf (1334 N), and 12,500 psi (86.1 MPa).

2.6 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.7 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

2.8 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

2.9 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black.

C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
5. Color: Black.

2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.

J. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30A, and 120V to ground: Identify with self-adhesive vinyl label. Install labels at 10-foot (3-m) maximum intervals.

B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:

1. Emergency Power.
2. Power.
3. UPS.

C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

E. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Install underground-line warning tape for both direct-buried cables and cables in raceway.

H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metal-backed, butyrate warning signs.

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

a. Power transfer switches.
b. Controls with external control power connections.

J. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

K. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer or load shedding.

L. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting,

control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

    a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
    b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
    c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

    a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
    b. Enclosures and electrical cabinets.
    c. Access doors and panels for concealed electrical items.
    d. Switchboards.
    e. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
    f. Emergency system boxes and enclosures.
    g. Enclosed switches.
    h. Enclosed circuit breakers.
    i. Enclosed controllers.
    j. Variable-speed controllers.
    k. Push-button stations.
    l. Power transfer equipment.
    m. Contactors.
    n. Remote-controlled switches, dimmer modules, and control devices.
    o. Battery-inverter units.
    p. Battery racks.
    q. UPS equipment.

END OF SECTION 260553

SECTION 262413 - SWITCHBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Service and distribution switchboards rated 600 V and less.
2. Transient voltage suppression devices.
3. Disconnecting and overcurrent protective devices.
4. Instrumentation.
5. Control power.
6. Accessory components and features.
7. Identification.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Switchboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.4 ACTION SUBMITTALS

A. Product Data: For each type of switchboard, overcurrent protective device, transient voltage suppression device, ground-fault protector, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

B. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.

4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Include descriptive documentation of optional barriers specified for electrical insulation and isolation.
6. Include evidence of NRTL listing for series rating of installed devices.
7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
8. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
9. Include diagram and details of proposed mimic bus.
10. Include schematic and wiring diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Seismic Qualification Certificates: Submit certification that switchboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Section 260548 "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For switchboards and components to include in emergency, operation, and maintenance manuals. Include the following:

1. Routine maintenance requirements for switchboards and all installed components.
2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
3. Time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log

graft paper; include selectable ranges for each type of overcurrent protective device.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers qualified as defined in NEMA PB 2.1 and trained in electrical safety as required by NFPA 70E.

B. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

C. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Comply with NEMA PB 2.

G. Comply with NFPA 70.

H. Comply with UL 891.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.

B. Remove loose packing and flammable materials from inside switchboards and install temporary electric heating (250 W per section) to prevent condensation.

C. Handle and prepare switchboards for installation according to NEMA PB 2.1.

1.9 PROJECT CONDITIONS

A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.

B. Environmental Limitations:

1. Do not deliver or install switchboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above

switchboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

    a. Ambient Temperature: Not exceeding 104 deg F (40 deg C).
    b. Altitude: Not exceeding 6600 feet (2000 m).

C. Service Conditions: NEMA PB 2, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

D. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect and Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Owner's written permission.
4. Comply with NFPA 70E.

1.10 COORDINATION

A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

1. Square D Company

B. Front-Connected, Front-Accessible Switchboards:

1. Main Devices: Fixed, individually mounted.
2. Branch Devices: Panel mounted.
3. Sections front and rear aligned.

C. Nominal System Voltage: 208Y/120 V.

D. Main-Bus Continuous: 1,200A.

E. Outdoor Enclosures: Nema 3R

F. Enclosure Finish for Outdoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.

G. Barriers: Between adjacent switchboard sections.

H. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.

I. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.

J. Buses and Connections: Three phase, four wire unless otherwise indicated.

1. Phase- and Neutral-Bus Material: Hard-drawn copper of 98 percent conductivity, silver-plated, with tin-plated aluminum or copper feeder circuit-breaker line connections.
2. Load Terminals: Insulated, rigidly braced, runback bus extensions, of same material as through buses, equipped with mechanical connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full-ampere rating of circuit-breaker position.
3. Ground Bus: 1/4-by-2-inch- (6-by-50-mm-) hard-drawn copper of 98 percent conductivity, equipped with mechanical connectors for feeder and branch-circuit ground conductors.
4. Main Phase Buses and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
5. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing

circuit neutral cables. Brace bus extensions for busway feeder neutral bus.

6. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.

K. Bus-Bar Insulation: Factory-applied, flame-retardant, tape wrapping of individual bus bars or flame-retardant, spray-applied insulation. Minimum insulation temperature rating of 105 deg C.

L. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components including instruments and instrument transformers.

2.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long- and short-time time adjustments.
    d. Ground-fault pickup level, time delay, and I^2t response.

3. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.
    c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
    e. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
    f. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.

2.3 INSTRUMENTATION

A. Instrument Transformers: IEEE C57.13, NEMA EI 21.1, and the following:

1. Current Transformers: IEEE C57.13; 5 A, 60 Hz, secondary; wound type; double secondary winding and secondary shorting device. Burden and accuracy shall be consistent with connected metering and relay devices.
2. Current Transformers for Neutral and Ground-Fault Current Sensing: Connect secondary wiring to ground overcurrent relays, via shorting terminals, to provide selective tripping of main and tie circuit breaker. Coordinate with feeder circuit-breaker, ground-fault protection.

2.4 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: For testing functions of solid-state trip devices without removing from switchboard. Include relay and meter test plugs suitable for testing switchboard meters and switchboard class relays.

2.5 IDENTIFICATION

A. Service Equipment Label: NRTL labeled for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store switchboards according to NEMA PB 2.1.

B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.

C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install switchboards and accessories according to NEMA PB 2.1.

B. Equipment Mounting: Install switchboards on concrete base, based on DSA approved drawings.

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to switchboards.

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.

D. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.

E. Install filler plates in unused spaces of panel-mounted sections.

F. Install overcurrent protective devices, transient voltage suppression devices, and instrumentation.

1. Set field-adjustable switches and circuit-breaker trip ranges.

G. Comply with NECA 1.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:

1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchboard 11 months after date of Substantial Completion.
c. Instruments and Equipment:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Switchboard will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated.

3.6 PROTECTION

A. Temporary Heating: Apply temporary heat, to maintain temperature according to manufacturer's written instructions, until switchboard is ready to be energized and placed into service.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories, and to use and reprogram microprocessor-based trip, monitoring, and communication units.

END OF SECTION 262413

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide materials, equipment and transportation and perform labor as required for removing natural and artificial objectionable materials from the work area in advance of grading operations.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 20 00: Site Grading

B. Section 31 25 00: Construction Storm Water Pollution Prevention

1.04 GEOTECHNICAL ENGINEERING REPORT / GEOTECHNICAL ENGINEER

A. A geotechnical engineering report has been prepared by Pacific Materials Laboratory for this project dated August 30, 2017.

B. A Geotechnical Engineer will be employed by the Owner to perform observation, testing and reporting during construction in accordance with the contract documents (hereinafter the Construction-Phase Geotech).

1.05 STANDARD SPECIFICATIONS

A. Construction materials and methods shall be in accordance with the ***Standard Specifications for Public Works Construction***, 2015 edition (SSPWC), published by Building News, Inc., except as modified or otherwise specified herein (hereinafter the Standard Specifications).

B. In case of conflict between the Standard Specifications and the Project Specifications, the Project Specifications shall govern.

1.06 REFERENCE SPECIFICATIONS

A. Construction materials and methods shall be in accordance with the site-specific recommendations contained in the Geotechnical Engineering Report(s) referenced in Paragraph 1.04 of this Section.

B. Storm water pollution prevention materials and methods shall be in accordance with the ***Construction BMP Online Handbook***, January 2015 edition, available online from the California Stormwater Quality Association.

C. In case of conflict between the Standard Specifications and the Reference Specifications, the Reference Specifications shall govern.

D. In case of conflict between the Reference Specifications and these Project Specifications, the more stringent provision shall govern, as determined by the Owner's Representative and the Engineer.

1.07 REGULATORY REQUIREMENTS

A. Construction shall comply with the ***California Code of Regulations, Title 24, Part 2*** (the ***California Building Code),*** most recent effective edition.

1.08 JOB SITE CONDITIONS

A. Contractor shall visit the site and shall familiarize himself with existing site conditions. Contractor shall make his own interpretations of site conditions and shall not be relieved of liability under the contract for any loss he may sustain as a result of any variance between conditions indicated by or deduced from said site visit and the actual conditions encountered during the progress of work.

B. Contractor shall assume sole and complete responsibility for job site conditions during the course of construction of this project including safety of all persons and property; this requirement shall apply continuously and not be limited to normal working hours.

C. Contractor shall assume sole and complete responsibility for protection of public and private property in the vicinity of the job site and shall, at Contractor's expense, repair or replace to original condition all existing improvements within or in the vicinity of the job site which are not designated for removal and which are damaged or removed as a result of Contractor's operations.

D. Contractor shall defend, indemnify and hold design professionals harmless from all liability and claims, real or alleged, in connection with the performance of work on this project, excepting liability arising from the sole negligence of design professionals.

E. Existing buried pipelines and conduits known to the preparer of the Drawings are shown on the Drawings. However, all such pipelines, conduits and structures may not be shown and the locations of those shown are approximate only and have not been independently verified by the preparer of the Drawings.

1. Contractor shall independently verify or determine the presence of existing buried pipelines, conduits and structures within the work area with the utility companies, the water and sanitary agencies, and the property Owner. Before commencing work, Contractor shall determine the exact locations including

depths of all existing underground pipelines, conduits and structures, including service connections, which may affect or be affected by his operations and shall mark these locations at the site with paint or flags.

2. Contractor shall be fully responsible for any and all damages which might be occasioned by Contractor's failure to exactly locate and preserve any and all underground pipelines, conduits and structures.

3. Upon becoming aware of existing buried pipelines, conduits or structures not shown or located differently than shown on the Drawings, Contractor shall immediately notify the Owner's Representative and the owner of the pipeline, conduit or structure by telephone and in writing. If such pipeline, conduit or structure affects or is affected by the work, Contractor shall obtain written permission and direction before proceeding with the work, excepting that in an emergency affecting safety of life, work or adjacent property, Contractor shall act at once without instructions to prevent injury or loss.

F. Contractor shall accept the site as it exists prior to start of construction and shall do all grading work necessary to accomplish earthwork as specified herein and to the finish grades and pavement subgrades shown on or indicated by the Drawings.

1.09 EARTHWORK QUANTITIES

A. Any earthwork quantity estimates which may be given on the Drawings are approximate only. Said estimates are based on the approximate difference between existing grades and proposed finish grades or pavement subgrades as indicated on the Drawings and do not include consideration for losses due to clearing and demolition operations, material shrinkage, consolidation and subsidence, or for landscaping improvements.

B. Contractor shall perform an independent earthwork quantity analysis on which to base his bid. Contractor shall not be relieved of liability under the contract for any loss he may sustain as a result of any variance between earthwork estimates which may be given on the Drawings and the actual earthwork quantities required to accomplish grading as specified herein and as necessary for construction of improvements to the finish grades called for on the Drawings.

1.10 RECORD DOCUMENTS

A. Comply with requirements of Division 1, "Project Record Documents" section, and following:

1. Accurately record location of pipelines, conduits and structures which are abandoned in place, including depth below finish grade, for Record Documents.

2. Accurately record changes in construction from that called for on the Drawings and Specifications, including unexpected physical conditions and unmarked or inaccurately marked existing pipelines, conduits and structures, for Record Documents.

1.11 QUALITY ASSURANCE

A. A Geotechnical Engineer will be employed by the Owner to perform observation, testing and reporting during construction in accordance with the contract documents (hereinafter the Construction-Phase Geotech).

B. Observation

1. Clearing and grubbing operations shall be periodically observed by the Construction-Phase Geotech.

2. Demolition operations requiring excavation more than 12 inches below existing ground surface shall be continuously observed by the Construction-Phase Geotech.

3. All plugging of pipelines or conduits allowed to be abandoned in place outside of building, artificial turf, and pavement areas shall be observed by the Construction-Phase Geotech.

4. Contractor shall notify the Geotechnical Engineer, the Construction-Phase Geotech, and the Owner's Representative at least five (5) working days prior to commencement of clearing operations.

5. The cost of observation by the Construction-Phase Geotech will be borne by the Owner.

6. The Construction-Phase Geotech shall certify that earthwork was properly completed in conformance with the Drawings and Specifications. Certification shall be in the form of a report to the Owner's Representative.

PART 2 - MATERIALS

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PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. Prior to beginning construction, perform a thorough field review of existing improvements within the jobsite; videotape the entire site, including adjacent improvements and / or properties along the site boundary and street frontage, and provide a copy of the tape in VHS format to the Owners Representative for approval.

B. Promptly notify the Owner's Representative and the agency having jurisdiction by telephone and in writing upon discovery of, and before disturbing, any physical conditions differing from those represented by approved Drawings and Specifications.

C. Before commencing clearing or other excavation, determine the exact location of all existing underground pipelines, conduits and structures, including service connections, and mark these locations at the site with paint or flags. Maintain these location markers for the duration of construction.

D. Section 4215.5 through 4217 of the government code of the State of California requires that, two working days prior to commencing any excavation, ***Underground Service Alert of Southern California*** be notified by telephone, toll free: 1-800-422-4133, for the assignment of an inquiry identification number. Before commencing clearing or other excavation, obtain the USA inquiry identification number and independently verify that each utility company or other owner of subsurface facility has located and physically marked their subsurface facilities in the area of work.

E. Before commencing clearing or other excavation, contact each utility company or other owner of subsurface facilities and verify whether or not a representative will be present before or during excavation and determine any specific requirements for excavation in the vicinity of each subsurface facility.

3.02 CLEARING AND GRUBBING

A. Prior to commencing grading or trenching operations, clear the existing ground surface of areas to be graded or trenched of all vegetation (except trees indicated on the Drawings to remain), whether living or dead, including roots and root structures, as well as all trash and debris, under the observation of the Construction Phase Geotech.

B. Prior to commencing grading or trenching operations, excavate and remove from areas to be graded or trenched all existing undocumented or non-complying fill and soil containing debris, organics, pavement and other unsuitable material, as determined by the Construction Phase Geotech.

C. If, during the removal and scarification process, excessive root structures are encountered, these areas shall be deep ripped in two directions to the depth of the root structure after which the disturbed soils and the roots shall be completely removed and the resulting cavities shall be scarified and processed to receive fill in accordance with recommendations contained in Section 31 20 00.

D. Stockpile surface soils containing organic material where directed by the Owner's Representative for later use in areas to be seeded or planted; coordinate this operation so that upon completion of the project, all excess material is removed from the job site and finish grades are as called for on the Drawings and as specified herein.

3.03 DEMOLITION

A. Where demolition activities are indicated on the Drawings or called for in the Specifications, clear old pavements, foundations, slabs, curbs, gutters, abandoned pipelines and conduits, and soils contaminated during demolition operations, as determined by the Construction Phase Geotech, **except where such clearing operations may jeopardize existing trees or structures to remain** ("jeopardize" with respect to a tree shall mean excavation within the dripline and with respect to a structure shall mean excavation below a line projected downward at a 2 horizontal to 1 vertical slope from a point 1 foot above the bottom of the foundation); in such case, request direction form the Owner's Representative before proceeding with the work.

B. In addition to demolition which may be indicated on the Drawings or called for in the Specifications, make a thorough search for abandoned facilities such as septic systems, fuel or water storage tanks, and pipelines or conduits. Remove any such abandoned facilities encountered, **except where such removal operations may jeopardize existing trees or structures to remain.**

C. **Abandoned facilities shall not remain in place within building, synthetic turf and pavement areas.** Building area is defined as that area within, and extending a minimum of 5 feet outside of, the perimeter of the building and the perimeter of steps, landings, patios, walkways and the like which are contiguous with the building. Pavement area is defined as that area within, and extending a minimum of 1 foot outside of, the limits of asphalt or concrete pavement and the limits of curb, gutter, and sidewalk contiguous with the pavement.

D. If pipelines or conduits are allowed to be abandoned in place outside of building, synthetic turf and pavement areas, and 24" minimum below finish subgrade, plug all exposed openings with stiff concrete placed within the pipeline/conduit to a minimum of three (3) lineal feet beyond the opening and rodded to remove voids (12" or larger) or with secured watertight cap (10" and smaller). All such plugging operations shall be observed by the Construction-Phase Geotech.

E. If catch basins, vaults or manhole structures are allowed to be abandoned in place outside of building, pavement and synthetic turf areas, remove the top and walls to 24" minimum below finish subgrade, plug inlet and outlet openings per paragraph D above and backfill the void within the structure with 2-sack cement / sand slurry, under the observation and testing of the construction phase Geotech.

3.04 TREE REMOVAL

A. Where trees are called for to be removed, such removal shall include the stump and all roots within the original drip line to 24 inches minimum below existing or finish grade, whichever is lower, and disposal of all material off site.

3.05 BACKFILLING VOIDS

A. Immediately replace voids or disturbed areas created during clearing and demolition operations, and which extend below the recommended overexcavation depth, with compacted fill. Do not place any fill until the underlying soil has been observed by the Construction-Phase Geotech. All fill and backfill shall be observed, tested and approved by the Construction-Phase Geotech.

3.06 CONTAMINATED SOIL

A. If abandoned septic tanks or fuel tanks or other potential sources of contamination or hazardous waste are encountered or if soil which appears to be contaminated is encountered, immediately notify the Owner's Representative.

3.07 DUST CONTROL

A. Contractor shall be responsible for control of dust during the entire construction period and for any damage caused by dust resulting from Contractor's operations.

B. Employ labor, equipment and methods required to prevent construction operations from producing dust damaging to persons, property, vegetation and animals or causing a nuisance to persons occupying buildings in the vicinity of the job site. Continue dust abatement measures until authorized by the Owner's Representative to discontinue them. Contractor shall be responsible for damage caused by dust resulting from his operations.

C. During times of earth disturbance or movement, monitor the amount of dust raised by the activity and water the areas being disturbed as needed to prevent dust from leaving the project site.

D. Impose a speed limit of 15 miles per hour for operation of construction vehicles on unpaved or disturbed areas.

E. Monitor the dust levels on access roads and apply water as needed to prevent dust from leaving the road areas.

F. Ensure that trucks transporting material form the site are tarped before leaving the site with tarps sufficiently secure to remain tarped to the point of disposal.

G. Cover stockpiled soil materials as required to prevent wind-blown dust.

3.08 NOISE CONTROL

A. Keep noisy equipment as far as possible from the site boundaries.

B. Install stationary equipment in enclosures.

C. Install factory-standard silencing equipment on power-operated equipment.

3.09 EROSION AND SEDIMENTATION CONTROL

A. Contractor shall be responsible for control of erosion and sediment transport during the entire construction period and for any damage caused by erosion or sediment transport resulting from Contractor's operations.

B. When a Storm Water Pollution Prevention Plan (SWPPP) is included with the Drawing Set, implement and maintain erosion and sedimentation control measures in accordance with the SWPPP and Section 31 25 00 of these Specifications.

C. When a SWPPP is not included with the Drawing Set, develop, implement and maintain sedimentation and erosion control measures in accordance with Section 31 25 00 of these Specifications and with the ***Construction BMP Online Handbook***, January 2015 edition, available online from the California Stormwater Quality Association.

3.10 TREE PROTECTION

A. Protect existing trees and other vegetation indicated to remain in place against: unnecessary cutting, breaking or skinning of roots; skinning and bruising of bark; smothering of trees by stockpiling construction materials or excavated materials within drip line; excess foot or vehicular traffic within drip line; parking of vehicles within drip line.

B. Provide temporary guards to protect trees and vegetation to be left standing.

C. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

D. Provide protection for roots over 1-1/2 inch diameter which are cut during construction operations.

1. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues.

2. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

E. Employ a licensed Arborist to supervise work within the drip line of trees to remain. Replace trees which cannot be repaired and restored to full-grown status, as determined by Arborist.

F. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Owner's Representative.

G. Comply with Landscape Architect's tree protection requirements, if applicable.

3.11 DISPOSAL

A. Remove from the work area, transport to a suitable location, and legally dispose of all unsuitable soil materials, rubbish, and debris resulting from clearing, demolition, and grading operations.

B. Burning is not permitted within the work area.

END OF SECTION

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SECTION 31 20 00

SITE GRADING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide materials, equipment and transportation and perform labor as required to complete the site grading as shown on the Drawings, specified herein or implied thereby to carry out the intent thereof.

B. The work includes but is not limited to the following:

1. All excavation to the grades shown on or indicated by the Drawings and as specified herein.

2. All earth fill to the grades shown on or indicated by the Drawings and as specified herein.

3. All import and export of earth material as required to accomplish the finish grades and pavement subgrades shown on or indicated by the Drawings and as specified herein.

4. All conditioning, placement, compaction, and recompaction of earthwork.

5. If found necessary by Construction Phase Geotech, removal and off-site disposal of unsuitable subgrade material and import, placement, and compaction of select soil or of aggregate encapsulated in geotextile, required to backfill void.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 10 00: Site Clearing

B. Section 31 25 00: Construction Storm Water Pollution Prevention

C. Section 32 13 13: Site Concrete

1.04 GEOTECHNICAL ENGINEERING REPORT / GEOTECHNICAL ENGINEER

A. A geotechnical engineering report has not been prepared for this project.

B. A Geotechnical Engineer will be employed by the Owner to perform observation, testing and reporting during construction in accordance with the contract documents (hereinafter the Construction-Phase Geotech).

1.05 STANDARD SPECIFICATIONS

A. Construction materials and methods shall be in accordance with the ***Standard Specifications for Public Works Construction,*** 2015 edition (SSPWC), published by Building News, Inc., except as modified or otherwise specified herein (hereinafter the Standard Specifications).

B. In case of conflict between the Standard Specifications and these Project Specifications, the Project Specifications shall govern.

1.06 REFERENCE SPECIFICATIONS

A. Construction materials and methods shall be in accordance with the site-specific recommendations contained in the Geotechnical Engineering Report(s) referenced in Paragraph 1.04 of this Section.

B. Where called for on the Drawings or in these Specifications, construction materials and methods shall be in accordance with the ***Standard Specifications and Standard Plans of the State of California Department of Transportation***, most recent effective editions (CalTrans Standards). Where Metric Units of measure are used in the referenced CalTrans Standards, the equivalent English Units shall be used.

C. Storm water pollution prevention materials and methods shall be in accordance with the ***Construction BMP Online Handbook***, January 2015 edition, available online from the California Stormwater Quality Association.

D. In case of conflict between the Standard Specifications and Reference Specifications, the Reference Specifications shall govern.

E. In case of conflict between Reference Specifications / Details and the Project Specifications / details, the more stringent provisions shall govern, as determined by the Owner's Representative and the Engineer.

1.07 REGULATORY REQUIREMENTS

A. Construction shall comply with the California ***Code of Regulations, Title 24, Part 2 (***the ***California Building Code),*** most recent effective edition.

B. Where the work site is within the city limits, grading shall conform with the ***Santa Barbara City Grading Code.***

1.08 SUBMITTALS

A. Provide submittals according to the Conditions of the Contract and Division 1 "Submittal Procedures" section.

B. Refer to "Submittal Requirements and Schedule" at the end of this section.

1.09 JOB SITE CONDITIONS

A. Contractor shall visit the site and shall familiarize himself with existing site conditions. Contractor shall make his own interpretations of site conditions and shall not be relieved of liability under the contract for any loss he may sustain as a result of any variance between conditions indicated by or deduced from said site visit and the actual conditions encountered during the progress of work.

B. Materials are assumed to be earth and material that can be worked with ordinary earthmoving equipment. If rock is encountered within the limits of construction, adjustments will be made in the contract in accordance with the Owner's Representative's instructions. Rock is defined as any stone or boulder that cannot be removed with power equipment without using explosives.

C. Contractor shall assume sole and complete responsibility for job site conditions during the course of construction of this project including safety of all persons and property; this requirement shall apply continuously and not be limited to normal working hours.

D. Contractor shall assume sole and complete responsibility for protection of public and private property in the vicinity of the job site and shall, at Contractor's expense, repair or replace to original condition all existing improvements within or in the vicinity of the job site which are not designated for removal and which are damaged or removed as a result of Contractor's operations.

E. Contractor shall defend, indemnify and hold design professionals harmless from all liability and claims, real or alleged, in connection with the performance of work on this project, excepting liability arising from the sole negligence of design professionals.

F. Existing buried pipelines and conduits known to the preparer of the Drawings are shown on the Drawings. However, all such pipelines, conduits and structures may not be shown and the locations of those shown are approximate only and have not been independently verified by the preparer of the Drawings.

1. Contractor shall independently verify or determine the presence of existing buried pipelines, conduits and structures within the work area with the utility companies, the water and sanitary agencies, and the property Owner. Before commencing work, Contractor shall determine the exact locations including depths of all existing underground pipelines, conduits and structures, including service connections, which may affect or be affected by his operations and shall mark these locations at the site with paint or flags.

2. Contractor shall be fully responsible for any and all damages which might be occasioned by Contractor's failure to exactly locate and preserve any and all underground pipelines, conduits and structures.

3. Upon becoming aware of existing buried pipelines, conduits or structures not shown or located differently than shown on the Drawings, Contractor shall immediately notify the Owner's Representative and the owner of the pipeline, conduit or structure by telephone and in writing. If such pipeline, conduit or structure affects or is affected by the work, Contractor shall obtain written permission and direction before proceeding with the work, excepting that in an emergency affecting safety of life, work or adjacent property, Contractor shall act at once without instructions to prevent injury or loss.

G. Contractor shall accept the site as it exists prior to start of construction and shall do all grading work necessary to accomplish earthwork as specified herein and to the finish grades and pavement subgrades shown on or indicated by the Drawings.

H. Contractor is responsible for preservation or perpetuation of all existing monuments which control subdivisions, boundaries, easements, streets, highways, or other rights-of-way, or which provide horizontal or vertical survey control which will be disturbed or removed due to Contractor's work. Prior to disturbance or removal of existing monuments, Contractor shall contract with licensed land surveyor to reset monuments or provide permanent witness monuments and file the required documentation with the County Surveyor pursuant to business and Professions Code Section 8771.

1.10 EARTHWORK QUANTITIES

A. Any earthwork quantity estimates which may be given on the Drawings are approximate only. Said estimates are based on the approximate difference between existing grades and proposed finish grades or pavement subgrades as indicated on the Drawings and do not include consideration for losses due to clearing and demolition operations, material shrinkage, consolidation and subsidence, or for landscaping improvements.

B. Contractor shall perform an independent earthwork quantity analysis on which to base his bid. Contractor shall not be relieved of liability under the contract for any loss he may sustain as a result of any variance between earthwork estimates which may be given on the Drawings and the actual earthwork quantities required to accomplish grading as specified herein and as necessary for construction of improvements to the finish grades called for on the Drawings.

1.11 SHORING AND PROTECTION

A. When making excavations adjacent to existing improvements or adjoining property, Contractor shall provide, install and maintain all sheeting, shoring, bracing and/or other protection necessary to prevent damage to existing improvements and failure of earth banks. Contractor shall repair or replace to original condition, at no cost to Owner, all existing improvements which are not designated for removal and which are removed or damaged as a result of Contractor's operations.

B. Contractor shall provide, install and maintain all sheeting, shoring, bracing and/or other protection necessary to prevent failures of temporary excavations and embankments until earthwork has been completed.

C. Shoring, bracing and other protection, including materials and methods, shall conform with all applicable laws, ordinances, rules and regulations including all requirements of ***State of California Construction and General Industry Safety Orders***, the ***Occupational Safety and Health Act of 1970***, and the ***Construction Safety Act***.

D. The design and detailing of sheeting and shoring systems shall be the responsibility of the Contractor. Contractor shall submit calculations and construction details signed and sealed by a Registered Civil or Structural Engineer to the Owner's Representative prior to beginning excavation.

1.12 RECORD DOCUMENTS

A. Comply with requirements of Division 1, "Project Record Documents" section, and following:

1. Accurately record location of pipelines, conduits and structures which are abandoned in place, including depth below finish grade, for Record Documents.

2. Accurately record changes in construction from that called for on the Drawings and Specifications, including unexpected physical conditions and unmarked or inaccurately marked existing pipelines, conduits and structures, for Record Documents.

3. Employ a Licensed Surveyor to spot check and record finish grades for Record Documents, pursuant to Paragraph 3.17 of this Section.

1.13 QUALITY ASSURANCE

A. A Geotechnical Engineer will be employed by the Owner to perform observation, testing and reporting during construction in accordance with the contract documents (hereinafter referred to as the Construction-Phase Geotech).

B. Material quality and compaction testing procedures shall be in accordance with standards of the ***American Society for Testing and Materials*** (hereinafter referred to as "ASTM"), latest editions.

C. The compaction standard shall be the latest adoption of the ASTM D-1557 method of compaction, or as determined by the Construction-Phase Geotech.

D. Testing

1. Tests shall be made by the Construction-Phase Geotech who shall determine the type and extent of testing necessary to assure that the earthwork was properly completed in conformance with the Drawings and Specifications.

2. Cost of tests shall be paid for by the Owner. If the tests prove the work not to be in conformance with the Drawings and Specifications, the cost of additional tests shall be paid for by the Owner and backcharged to the Contractor.

E. Observation

1. Earthwork within proposed pavement and building areas shall be continuously observed and earthwork outside of building and pavement areas shall be periodically observed by the Construction-Phase Geotech to ensure compliance with the Drawings and Specifications. Contractor shall notify the Geotechnical Engineer, the Construction-Phase Geotech, and the Owner's Representative at least five (5) working days prior to commencement of grading operations.

2. The cost of observation by the Construction-Phase Geotech shall be borne by the Owner.

3. The Construction-Phase Geotech shall certify that earthwork was properly completed in conformance with the Drawings and Specifications. Certification shall be in the form of a report to the Owner's Representative.

F. All import earth fill material shall be evaluated and approved by the Construction-Phase Geotech and shall be approved by the Owner's Representative prior to importing.

G. Employ a Licensed Surveyor to lay out the work, set grade stakes, check forms, check surface of pavement base courses, and spot check and record finish grades for the Record Drawings, pursuant to Paragraph 3.17 of this Section and Section 01 51 00 Construction Surveying.

PART 2 - MATERIALS

2.01 FILL MATERIAL, GENERAL

A. All fill soils shall be free of oversized rocks and irreducible material (over 3 inches in largest dimension), trash and debris, organics, and deleterious materials. Rocks and irreducible material no larger than 3 inches may be blended into the fill in a sufficient soil matrix such that nesting and voids do not occur and the material can be properly compacted, under the observation of the Construction-Phase Geotech.

2.02 FILL MATERIAL, ON-SITE

A. On-site soils free of oversize rocks and irreducible material (over 3 inches in largest dimension), trash and debris, organics and deleterious materials may be used as fill, subject to prior review and approval by the Construction Phase Geotech.

B. On-site soils free of oversize rocks and irreducible material, trash and debris, and deleterious materials may be used as fill in areas to be landscaped, subject to prior review and approval by the Landscape Architect and the Construction Phase Geotech.

C. Variation in organic content, expansion potential, and other characteristics of on-site soils within the expected depths of grading should be anticipated. During earthwork operations, on-site soils shall be reviewed and approved for organic content, expansion potential, and other characteristics by the construction-Phase Geotech before being used as fill under building and pavement areas.

2.03 FILL MATERIAL, IMPORT

A. Import earth fill material shall be granular, non-expansive soils which are equal or superior in quality to the on-site soils, as determined by the Construction Phase Geotech prior to importation of the fill material to the site.

B. Import earth fill material shall be evaluated by the Construction-Phase Geotech and shall be approved by the Owner's Representative prior to importing. Contractor shall arrange for the Construction-Phase Geotech to evaluate the proposed material at least five (5) working days prior to commencement of grading operations. The material shall also be evaluated by the Construction-Phase Geotech upon arrival at the site and intermittently during placement and compaction at the site.

2.04 SUBGRADE STABILIZATION MATERIAL

A. Where recommended by the Construction-Phase Geotech, subgrade stabilization material shall conform to one of the following:

1. Select imported fill soil having an Expansion Index of 30 or less and approved by the Construction-Phase Geotech prior to importation to the site.

2. Gabion rock aggregate imported from Bee Rock Mine or crushed aggregate base (material and thickness to be specified by Construction Phase Geotech), encapsulated with Mirafi 600X geotextile fabric between stabilization aggregate and subgrade soil below and Mirafi 140N geotextile fabric between stabilization aggregate and base material above.

2.05 EROSION CONTROL MATERIALS

A. FOR SLOPES LESS THAN 10% (10H:1V):

Bark Mulch, 1" maximum size, 1" minimum thick layer.

B. FOR SLOPES LESS THAN OR EQUAL TO 33% (3H:1V):

Jute mesh.

C. FOR SLOPES GREATER THAT 33% (3H:1V):

North American Green S 75 straw blanket.

D. FOR LINING EARTH / VEGETATED DRAINAGE SWALES:

North American Green P300 Erosion Control / Turf Reinforcement Mat.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. Prior to beginning construction, perform a thorough field review of existing improvements within the jobsite; videotape the entire site, including adjacent improvements and / or properties along the site boundary and street frontage, and provide a copy of the tape in VHS format to the Owners Representative for approval.

B. Promptly notify the Owner's Representative and the agency having jurisdiction by telephone and in writing upon discovery of, and before disturbing, any physical conditions differing from those represented by approved Drawings and Specifications.

C. Before commencing clearing or other excavation, determine the exact location of all existing underground pipelines, conduits and structures, including service connections, and mark these locations at the site with paint or flags. Maintain these location markers for the duration of construction.

D. Section 4215.5 through 4217 of the government code of the State of California requires that, two working days prior to commencing any excavation, ***Underground Service Alert of Southern California*** be notified by telephone, toll free: 1-800-422-4133, for the assignment of an inquiry identification number. Before commencing clearing or other excavation, obtain the USA inquiry identification number and independently verify that

each utility company or other owner of subsurface facility has located and physically marked their subsurface facilities in the area of work.

E. Before commencing clearing or other excavation, contact each utility company or other owner of subsurface facilities and verify whether or not a representative will be present before or during excavation and determine any specific requirements for excavation in the vicinity of each subsurface facility.

F. Conduct site grading operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from Owner or authorities having jurisdiction.

3.02 SITE LAYOUT

A. Layout work and set grade stakes as necessary to control earthwork operations such that all grading conforms to the lines and grades called for on the Drawings and as specified herein.

B. If not dimensioned, request information from Owner's Representative to locate finish grade elevations and features such as swales, ridge lines, etc.

C. Assume uniform gradients or vertical curves, as appropriate, between control elevations shown on the Drawings.

D. Maintain surface drainage gradient on soil or landscaped areas at not less than 2% (1/4" per foot) unless specifically indicated otherwise on the Drawings.

E. Maintain positive drainage away from all structures and, unless specifically indicated otherwise on the Drawings, from all slopes. Provide openings in screen walls and fences to allow uninterrupted flow of surface drainage.

F. Plan elevations shown on soil and landscaped areas are finish grade (finish surface) elevations intended to establish surface drainage control for these areas. During grading operations, subtract thicknesses (subgrade allowances) specified by Landscape Architect for turf, wood chips, mulch, etc. from these elevations to establish finish subgrade.

G. Plan elevations shown on walkways, ramps, steps and other hardscape are intended to establish grading and surface drainage control for these improvements. Adhere to these control elevations unless otherwise necessary for construction of these improvements in conformance with ***Building Code*** and ***A.D.A.*** requirements; perform detailed layout for and construct walkways, ramps, steps, and other hardscape in conformance with all building code and accessibility requirements, including those for dimensioning, slope, cross-slope, surface texture, warning curbs, and hand-rails.

H. Drop-off from top of walk or flatwork edge to adjacent finish surface shall not exceed 2 inches along the edge and the finish surface cross slope shall not exceed ¼ inch per foot (2%) within 24 inches of the edge unless a 6-inch high warning curb is constructed along

the edge and the edge is thickened (deepened) to 6-inches minimum below adjacent finish grade.

3.03 GRADING

A. Perform site clearing operations per Section 31 10 00: Site Clearing hereof.

B. Do all rough and finish grading as necessary to bring the site to the lines and grades called for on the Drawings and as specified in this Section 31 20 00, within the following tolerances:

1. Finish subgrade soil beneath base course shall not vary more than ½ inch (0.04 foot) from the design elevation, slope and cross section, established with due allowance for thicknesses of base course and surfacing. Variations within the specified tolerance shall be compensating such that the average elevation, slope, and cross section conform to those specified per plan.

2. Finish base course for pavements and for walkways, curbs, gutters, driveway aprons, and other pavement-related structures shall not vary more that ½ inch (0.04 foot) from the design elevation, slope and cross section, established with due allowance for thickness of surfacing. Variations within the specified tolerance shall be compensating such that the average elevation, slope, and cross section conform to those specified per plan.

3. Finish grades in landscaped areas or other soil areas not to be surfaced shall not vary more than 1 inch (0.08 foot) above or below the design elevation and cross slope, established with due allowance for thickness of mulch or sod. Variations within the specified tolerance shall be compensating such that the average elevation, slope, and cross section conform to those specified per plan.

C. Import fill material or remove excess material as necessary to conform to the lines and grades called for on the Drawings and as specified herein. Legally dispose of all excess excavation materials off site.

3.04 PREPARATION OF SITE FOR FILL AND SURFACE IMPROVEMENTS

A. Strip a sufficient depth (as determined by the Construction-Phase Geotech) of surface soil from areas to receive fill to remove vegetation (except trees indicated on the Drawings to remain), roots, and other organic material and to remove loose topsoil. Stockpile this material where directed by the Owner's Representative for later use in areas to be seeded or planted. Remove and dispose of all or any remaining portion of this material when directed by the Owner's Representative or upon completion of the project.

B. Excavate and remove all trash, debris, pavement, organic material and other unsuitable material from areas to receive fill, under the observation of the Construction-Phase Geotech.

C. If, during the removal and scarification process, excessive root structures are encountered, deep rip these areas in two directions to the depth of the root structure, completely remove the disturbed soils and the roots, and scarify and process the resulting cavities to receive fill in accordance with the provisions of this section.

D. Remove existing undocumented or non-complying fill and loose earth from areas to receive fill and replace depressions or disturbed areas left from removals with compacted fill, under the observation and testing of the Construction-Phase Geotech.

E. Before placing any fill material, request review of the exposed in-place soils by, and prepare these soils to receive fill as recommended by, the Construction-Phase Geotech, including:

1. Correcting any soft, overwet or pumping areas, as recommended

2. Overexcavating or scarifying, moisture conditioning, and recompacting as recommended and at least the upper 8 inches to at least 90% of maximum density

F. Construct a keyway at the toe of all fill slopes which are to be constructed on natural slopes which are inclined at an angle of 5 horizontal to 1 vertical or steeper. This key shall be a minimum of 12 feet in width, shall extend a minimum of 30 inches below the original undisturbed ground surface measured at the toe of the slope, shall extend a minimum of 4 feet beyond the toe of the slope, and shall be inclined slightly into the hill. Confirm design of keyway with Construction Phase Geotech prior to constructing; the need to protect certain existing buried facilities may allow for modification to keyway dimensions.

G. Construct benches in areas to receive fill where existing surface slope is 1 or more vertical in 5 horizontal. Confirm design of benches with Construction-Phase Geotech prior to constructing.

3.05 PLACEMENT OF FILL, GENERAL

A. Do not place any fill material, including aggregate or sand base material, until the ground surface prepared to receive it has been reviewed and approved by the Construction-Phase Geotech and by the Owner's Representative.

B. During fill placement, construct all contact surfaces between undisturbed original ground and compacted fill material on either horizontal or vertical planes and a minimum of 24 inches below the original undisturbed ground surface.

C. Overbuild fill slopes and cut to finish grade to ensure specified compaction in all portions of slope face.

D. Construct fill slopes to the configuration shown on the Drawings and at a maximum inclination of 2 horizontal to 1 vertical; compact slope faces by rolling a sheepsfoot roller or similar compaction equipment over the slope face at vertical lift intervals of 30 inches or less.

E. Spread each layer of fill evenly and blade-mix it thoroughly during spreading to attain a relative uniformity of material within each layer.

F. If moisture content of material is below that sufficient to achieve compaction requirements, add water to and mix the soil to attain a relatively uniform moisture content throughout the material. If moisture content is excessive, aerate the soil by blading or other methods.

G. Place fill materials in layers that can be compacted with the equipment being used and as required by the Construction-Phase Geotechnical Engineer but not more than 6 inches in loose thickness.

H. After each layer has been conditioned and placed, compact the material to the following densities:

1. Structural Fill not otherwise specified: minimum 90% of maximum density

2. Upper 12" of areas to receive landscaping but no other surface improvements: 85% of maximum density

3. Sand layer and upper 6" of subgrade soil beneath sand layer in walkway areas: minimum 95% of maximum density

4. Aggregate base course and upper 9" of subgrade soil beneath aggregate base course in paved areas: minimum 95% of maximum density

I. Remove compacted fill determined by the Construction-Phase Geotech to not meet density requirements and replace and re-compact at Contractor's expense.

3.06 SPECIAL GRADING PROCEDURES UNDER BUILDING AREA

A. These grading procedures apply to all areas beneath, and extending a minimum of 5 feet outside the exterior perimeters of, building structures including adjacent walkways, ramps, stairs, and roof cover support columns.

B. Comply with grading procedures recommended for areas beneath the proposed structures as stipulated in the Geotechnical Engineering Report referenced in Paragraph 1.04 of this Section.

3.07 SPECIAL GRADING PROCEDURE UNDER PAVEMENT AREAS

A. These grading procedures apply to all areas within, and extending a minimum of 1 foot outside of, the limits of asphalt or concrete pavement, the limits of curb, gutter, and sidewalk contiguous with the pavement, and the limits of site walkways, flatwork, ramps and stairs.

B. Excavate existing soil to a depth which removes all existing non-complying fill and disturbed natural soils, as determined by the Construction-Phase Geotechnical Engineer, or to the bottom of the proposed base course, whichever is deeper.

C. Scarify the bottom of excavations exposed pursuant to Paragraph 3.07-B above to a minimum depth of 8 inches and recompact to a minimum of 90 percent of maximum density; at least 9 inches of subgrade material below the aggregate base course in pavement and walkway areas and 12 inches below the stone underlayment in synthetic turf areas shall be compacted to a minimum of 95 percent of maximum density.

D. For fill required to achieve subgrade elevations, use on-site soil or imported soil meeting the requirements for fill material per Part 2 of this Section. Condition, place, and compact this material to minimum 90% of maximum density to a level at least 9 inches below aggregate base material in pavement and walkway areas and at least 12 inches below stone underlayment in synthetic turf areas. Compact remaining fill to bottom of aggregate base material or sand course to minimum 95% of maximum density.

E. Moisten or dry scarified soil and fill material to near the optimum moisture content before compacting.

F. For those areas where **specific thicknesses** of surfacing and base courses are given on the Detail Drawings, finish grading to required subgrade elevations.

G. For those areas where **estimated thicknesses** of surfacing and base courses are given on the Detail Drawings, bring the areas to rough subgrade elevations based on the estimated thicknesses; request determination by the Construction-Phase Geotech of actual thickness of pavement surfacing and base courses based on the results of R-Value tests to be conducted on the rough subgrade material and the Traffic Index(es) shown on the Detail Drawings; perform additional grading if necessary to adjust subgrade elevations to accommodate the final pavement structural section thickness.

H. Proof-roll finish subgrade with heavy, rubber-tired construction equipment under the observation of the Construction Phase Geotech; surface shall be firm and unyielding. Any areas found to be yielding under the wheel loads of the equipment shall be stabilized.

3.08 STABILIZING SUBGRADE

A. If determined to be necessary by the Construction-Phase Geotech pursuant to Paragraph 3.04E or 3.07H above, stabilize subgrade soil by one of the following measures, subject to the approval of the Geotech:

1. Excavate to the recommended depth below the exposed in-place soil surface, remove unsuitable material, and dispose of off-site; import, place, and compact select fill soil conforming to Paragraph 2.04 above as necessary to fill the void created; all under the observation and testing of the Construction-Phase Geotech.

2. Excavate to the recommended depth below the exposed in-place soil surface, remove unsuitable material, and dispose of off-site; import, place, and compact gabion rock aggregate or crushed aggregate base encapsulated with geotextile fabric conforming to Paragraph 2.04 above between the stabilization aggregate and subgrade soil below and on the sides and between the stabilization aggregate and base material above, to fill the void created; all under observation and testing of Construction-Phase Geotech.

3.09 SPECIAL REQUIREMENT FOR LANDSCAPE CONTRACTOR

A. Landscape Contractor shall remove from the site and properly dispose of all earth spoil from plant holes and pipe trenches; excess soil and/or mulch shall not be placed or spread at the site.

3.10 EROSION CONTROL / REVEGETATION

A. As required by storm water pollution prevention regulations, implement revegetation of each disturbed soil area within 2 weeks after completion of construction resulting in soil disturbance, unless additional disturbance will occur within 3 weeks.

B. Where Landscaping Plans and Specifications are included with the Contract Documents, construct landscaping and irrigation in accordance therewith.

C. Where Landscaping Plans and Specifications are not included with the Contract Documents or are included but do not address disturbed soil areas, construct hydroseeding as follows:

1. Evenly place and spread top soil stockpiled pursuant to Paragraph 3.04A above, across the disturbed area and compact to 85% of maximum density to the finish grades called for on the Drawings.

2. Request seed mix specification from District / School, including fertilizer, mulch and stabilizer. Provide, mix, and apply hydroseeding in accordance with the supplier's instructions.

3. If District / School does not specify seed mix, provide, mix and apply hydroseeding in accordance with Section 26-3.04B of the Caltrans Standards; hydroseeding components shall be as follows:

a. SEED MIX ONE (permanent irrigation not available):

blando brome	40%	
zorro annual fescue	8%	
lana vetch	12%	
rose clover	15%	
crimson clover	15%	
sub clover	10%	
Total	100%	applied at 350 lbs/acre

b. SEED MIX TWO (permanent irrigation available):

Sports Turf Pro Mix available from S&S Seeds, applied at 500 lbs/acre

c. FERTILIZER:

Gro-Power Plus, applied at 300 lbs/acre

d. MULCH:

Wood cellulose fiber, applied at 2,000 lbs/acre

e. STABILIZER:

Ecology Control M Binder, available from S&S, applied at 75 lbs/acre

4. Provide and install erosion control materials per Section 2.05 hereof on all disturbed areas in accordance with the manufacturer's installation guidelines.

5. Unless permanent irrigation is in place, provide manpower, materials and equipment as necessary to irrigate hydroseeded areas until plants are dense and growing, as determined by the Owner's Representative.

6. Where permanent irrigation system is in place, repair piping, valves, valve boxes, and sprinkler heads and adjust as necessary for compatibility with new finish grades and site configuration.

7. In all cases, Contractor shall have sole responsibility for performing irrigation itself, or for ensuring that irrigation is performed by others, as necessary until plants / grasses are dense and growing, as determined by the Owner's Representative.

3.11 CONTAMINATED SOIL

A. If abandoned septic tanks or fuel tanks or other potential sources of contamination or hazardous waste are encountered or if soil which appears to be contaminated is encountered, immediately notify the Owner's Representative.

3.12 DUST CONTROL

A. Contractor shall be responsible for control of dust during the entire construction period and for any damage caused by dust resulting from Contractor's operations.

B. Employ all labor, equipment and methods required to prevent construction operations from producing dust in amounts damaging to person, property, vegetation and animals or causing a nuisance to persons occupying buildings in the vicinity of the job site. Continue dust abatement measures until relief is granted by the Owner's Representative.

C. During times of earth disturbance or movement, monitor the amount of dust raised by the activity and water the areas being disturbed as needed to prevent dust from leaving the project site and to create a crust after each day's activities cease.

D. Impose a speed limit of 15 miles per hour for operation of construction vehicles on unpaved or disturbed areas.

E. Monitor the dust levels on access roads and apply water as needed to prevent dust from leaving the road area.

F. Ensure that trucks transporting material from the site are tarped before leaving the site and remain tarped to the point of disposal.

G. Cover stockpiled soil materials to prevent wind-blown dust.

3.13 NOISE CONTROL

A. Keep noisy equipment as far as possible from the site boundaries.

B. Install stationary equipment in enclosures.

C. Install factory-standard silencing equipment on power-operated equipment.

3.14 EROSION AND SEDIMENTATION CONTROL

A. Contractor shall be responsible for storm water pollution prevention including control of erosion and sediment transport during the entire construction period and for any damage caused by pollution resulting from Contractor's operations.

B. When a Storm Water Pollution Prevention Plan (SWPPP) is included with the Contract Documents, implement and maintain pollution prevention measures in accordance with the SWPPP and Section 31 25 00 of these Specifications.

3.15 TREE PROTECTION

A. Protect existing trees and other vegetation indicated to remain in place against: unnecessary cutting, breaking or skinning of roots; skinning and bruising of bark;

smothering of trees by stockpiling construction materials or excavated materials within drip line; excess foot or vehicular traffic within drip line; parking of vehicles within drip line.

B. Provide temporary guards to protect trees and vegetation to be left standing.

C. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

D. Provide protection for roots over 1-1/2 inch diameter which are cut during construction operations.

1. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues.

2. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

E. Employ a licensed Arborist to supervise work within the drip line of trees to remain. Replace trees which cannot be repaired and restored to full-grown status, as determined by Arborist.

F. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Owner's Representative.

G. Comply with Landscape Architect's tree protection requirements, if applicable.

3.16 DISPOSAL

A. Remove from Owner's property, transport to a suitable off-site location, and legally dispose of unsuitable and excess soil materials, rubbish, and debris resulting from clearing, demolition, and grading operations.

B. Burning is not permitted on the Owner's property.

3.17 RECORD SURVEY

A. Employ a Licensed Surveyor to determine by survey and to record the degree of construction conformity to design at select locations, as follows:

1. Flowline elevation of earth swales and channels at 50-foot maximum spacing.

2. Inclination of graded slopes at 50-foot maximum horizontal spacing.

Section continues on next page

3.18 SUBMITTAL REQUIREMENTS AND SCHEDULE

A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1, "Substitutions" section, for substitution requests.

Contractor's Initials: [Contractor is to acknowledge with initials each submittal included]

____ Letter of explanation attached for each submittal not included.

____ All submitted products are as specified.

B. SUBMITTAL SCHEDULE

____ 1. Submit hydro-seed component mix.

____ 2. Submit manufacturer's product data and recommended installation procedures for erosion control blanket.

____ 3. Submit shoring calculations and details as may be required pursuant to Paragraph 1.11 of this Section.

____ 4. Submit manufacturer's product data and recommended installation procedures for geotextile fabric for subgrade stabilization.

END OF SECTION

SECTION 31 23 00

TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide materials, equipment, transportation and labor as required for excavating trenches, dewatering, stabilizing trench subgrade, placing and compacting bedding material, and placing and compacting pipe zone backfill material for piped utility and storm drain piping and structures outside the exterior walls of the buildings.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 25 00: Construction Storm Water Pollution Prevention

1.04 STANDARD SPECIFICATIONS

A. Construction materials and methods shall be in accordance with the ***Standard Specifications for Public Works Construction,*** 2015 edition (SSPWC), published by Building News, Inc., except as modified or otherwise specified herein (hereinafter the Standard Specifications).

B. In case of conflict between the Standard Specifications and the project specifications, the project specifications shall govern.

1.05 REFERENCE SPECIFICATIONS

A. Construction materials and methods shall be in accordance with the site-specific recommendations contained in the Geotechnical Engineering Report(s) for this project.

B. Storm water pollution prevention materials and methods shall be in accordance with the ***Construction BMP Online Handbook***, January 2015 edition, available online from the California Stormwater Quality Association.

C. In case of conflict between the Standard Specifications and the Reference Specifications, the Reference Specifications shall govern.

D. In case of conflict between the Reference Specifications and these Project Specifications, the more stringent provision shall govern, as determined by the Architect and Engineer.

1.06 REGULATORY REQUIREMENTS

A. Construction shall comply with the ***California Code of Regulations, Title 24, Part 2*** (the ***California Building Code),*** most recent effective edition.

B. Construction shall comply with applicable health and safety laws and standards including rules, orders and regulations of the ***State of California Construction and General Industry Safety Orders,*** the ***Occupational Safety and Health Act of 1970,*** and the ***Construction Safety Act.***

1.07 SUBMITTALS

A. Provide submittals according to the Conditions of the Contract and Division 1 "Submittal Procedures" section.

B. Refer to "Submittal Requirements and Schedule" at the end of this Section.

1.08 JOB SITE CONDITIONS

A. Contractor shall visit the site and shall familiarize himself with existing site conditions. Contractor shall make his own interpretations of site conditions and shall not be relieved of liability under the contract for any loss he may sustain as a result of any variance between conditions indicated by or deduced from said site visit and the actual conditions encountered during the progress of work.

B. Materials are assumed to be earth and material that can be worked with ordinary trenching equipment. If rock is encountered within the limits of construction, adjustments will be made in the contract in accordance with the Owner's Representative's instructions. Rock is defined as any stone or boulder that cannot be removed with power equipment without using explosives.

C. Contractor shall assume sole and complete responsibility for job site conditions during the course of construction of this project including safety of all persons and property; this requirement shall apply continuously and not be limited to normal working hours.

D. Contractor shall assume sole and complete responsibility for protection of public and private property in the vicinity of the job site and shall, at Contractor's expense, repair or replace to original condition all existing improvements within or in the vicinity of the job site which are not designated for removal and which are damaged or removed as a result of Contractor's operations.

E. Contractor shall defend, indemnify and hold Design Professionals harmless from all liability and claims, real or alleged, in connection with the performance of work on this project, excepting liability arising from the sole negligence of Design Professionals.

F. Existing buried pipelines and conduits known to the Design Professionals are shown on the Drawings. However, all such pipelines, conduits and structures may not be shown and the locations of those shown are approximate only and have not been independently verified by the preparer of the Drawings.

1. Contractor shall independently verify or determine the presence of existing buried pipelines, conduits and structures within the work area with the utility companies, the water and sanitary agencies, and the property Owner. Before commencing work, Contractor shall determine the exact locations including depths of all existing underground pipelines, conduits and structures, including service connections, which may affect or be affected by his operations and shall mark these locations at the site with paint or flags.

2. Contractor shall be fully responsible for any and all damages which might be occasioned by Contractor's failure to exactly locate and preserve any and all underground pipelines, conduits and structures.

3. Upon becoming aware of existing buried pipelines, conduits or structures not shown or located differently than shown on the Drawings, Contractor shall immediately notify the Owner's Representative and the owner of the pipeline, conduit or structure by telephone and in writing. If such pipeline, conduit or structure affects or is affected by the work, Contractor shall obtain written permission and direction before proceeding with the work, excepting that in an emergency affecting safety of life, work or adjacent property, Contractor shall act at once without instructions to prevent injury or loss.

PART 2 - MATERIALS

2.01 BEDDING AND PIPE ZONE BACKFILL MATERIAL

A. Unless otherwise called for on the Drawings or herein, pipe bedding and backfill material to 12 inches minimum above top of pipe shall be imported clean sand of such particle gradation that 90 to 100 percent of the material shall pass through a No. 4 sieve, less than 5 percent shall pass through a No. 200 sieve, and the Sand Equivalent value of the material is not less than 40. For processed sand, a maximum of 15 percent shall pass through a No. 200 sieve.

B. Pipe bedding and backfill material for trenches on slopes greater than 5H:1V shall be native material screened to remove rocks, clods and other hard material larger than ½ inch in greatest dimension.

C. Bedding material used to stabilize yielding trench subgrade shall be as recommended by the Construction Phase Geotechnical Engineer.

2.02 TRENCH BACKFILL MATERIAL

A. UNPAVED AREAS

Trench backfill material from 12 inches above the top of pipe to finish grade in unpaved areas shall be native soil, or imported soil, meeting the requirements of the Construction-Phase Geotechnical Engineer.

B. PAVED AREAS

Trench backfill material from 12 inches above the top of pipe to the bottom of the aggregate base course in paved areas or to the bottom of the stone underlayment in synthetic turf areas shall conform to the specification for bedding and pipe zone backfill per Subsection 2.01 above.

C. Trench backfill material, whether native or imported shall be free of organics and deleterious material and free of lumps or stones larger than 3 inches in maximum dimension.

2.03 CONCRETE HAUNCHING AND ENCASEMENT

A. Where called for on the Drawings, pipe bedding and/or haunching and/or backfill material shall be Portland Cement concrete conforming to Section 32 13 13 hereof.

2.04 SAND / CEMENT SLURRY BACKFILL

A. Where called for on the Drawings, material for pipe bedding / pipezone backfill (encasement), for trench backfill, or for trench plugs shall be plant-mixed sand/cement slurry containing not less than 2 sacks (188 pounds) of Type II Portland cement per cubic yard.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. Promptly notify the Owner's Representative and the agency having jurisdiction by telephone and in writing upon discovery of, and before disturbing, any physical conditions differing from those represented by approved plans and specifications.

B. Before beginning trenching, locate and expose all existing buried conduits, pipelines and structures which cross or may otherwise interfere with proposed construction. Employ a Licensed Land Surveyor to determine horizontal and vertical locations of potential obstructions, identify any conflicts with proposed construction, and provide this information to Owner's Representative for review. Allow at least five (5) working days for review.

C. Section 4215.5 through 4217 of the government code of the State of California requires that, two working days prior to commencing any excavation, ***Underground Service Alert of Southern California*** be notified by telephone, toll free 1-800-422-4133, for the assignment of an inquiry identification number. Before commencing trenching, obtain the USA inquiry identification number and independently verify that each utility company or other owner of subsurface facility has located and physically marked their subsurface facilities in the area of the work.

D. Before commencing trenching, contact each utility company or other owner of subsurface facilities and verify whether or not a representative will be present before and/or during excavation and determine any specific requirements for excavation in the vicinity of each subsurface facility.

E. Before beginning work, verify that excavation will not take place below a line projected downward at a 2 horizontal to 1 vertical slope from a point 9 inches above the bottom of existing or proposed structure foundations adjacent to the work; if proposed trench/foundation geometry is determined to be contrary to this requirement, request direction from Owner's Representative before proceeding with the work.

F. Employ a Licensed Surveyor to provide line and grade control for trench excavation and backfill.

G. Begin trenching for gravity pipelines at the lowest point of discharge and proceed in the upgrade direction.

H. Have compaction of pipe bedding and backfill and of trench backfill tested and reported to the Owner's Representative by the Construction-Phase Geotechnical Engineer.

3.02 SAWCUTTING

For trench to be excavated in existing paved areas, construct **initial sawcut line** parallel with the proposed pipeline or conduit along the limits of excavation. See Subsection 3.11-B hereof for final sawcut.

3.03 TRENCH EXCAVATION

A. Excavate trench to lines and grades indicated on the Drawings, including due allowance for thickness of bedding material.

B. Request observation of trench subgrade condition by the Construction-Phase Geotech.

3.04 SHORING

A. Provide, install and maintain sheeting and/or shoring systems as necessary to prevent failure of trench walls and as required by applicable laws, ordinances, rules, and regulations including those of the ***State of California Construction and General***

Industry Safety Orders, the ***Occupational Safety and Health Act of 1970,*** and the ***Construction Safety Act.***

B. Have sheeting and shoring systems designed by a Licensed Civil or Structural Engineer and submit signed and sealed calculations and construction details to the Owner's Representative prior to beginning excavation.

3.05 TRENCH PREPARATION

A. Provide, install and operate dewatering systems as necessary to lower groundwater levels in the trench to at least 24 inches below the trench bottom and as directed by the Construction-Phase Geotechnical Engineer. Continue dewatering until otherwise approved by the Owner's Representative.

B. Stabilize yielding subgrade where required by the Drawings or as directed by the Construction-Phase Geotechnical Engineer.

C. Keep excavations free from water, whether it be from groundwater, rainfall or discharge from existing pipelines. Use pumps if necessary.

D. Request observation of finish trench subgrade condition by the Construction-Phase Geotechnical Engineer.

E. Place and compact bedding material to minimum 95% of maximum density. Shape bedding material by hand to conform with bottom of pipe and fittings. Do not place bedding material before trench subgrade has been approved.

3.06 TRENCH BACKFILL AND COMPACTION

A. After piping has been installed and assembled and has been observed and approved by the Owner's Representative, place and compact pipe zone backfill material to minimum 95% of maximum density to 12 inches above pipe in maximum 6-inch lifts. Have compaction density confirmed by testing by the Construction-Phase Geotechnical Engineer.

B. Place and compact trench backfill material to finish grade in unpaved areas or to the bottom of the aggregate base course in paved areas in maximum 6-inch lifts. Nesting of lumps or stones is not permitted.

C. Trench backfill compaction shall be to not less than 90% of maximum density; the upper 9" below the aggregate base course in paved and hardscape areas and the upper 12" below the stone underlayment in synthetic turf areas shall be to not less than 95% of maximum density. Compaction density shall be confirmed by testing and reported to the Owner's Representative by the Construction-Phase Geotechnical Engineer.

D. Trench backfill shall not be placed until pipe zone backfill has been tested and approved.

E. Compaction by flooding or jetting is not permitted.

3.07 SAND / CEMENT SLURRY BACKFILL

A. Where slurry encasement is called for on the Drawings or is determined to be necessary during construction, pipe bedding and pipe zone backfill from 4 inches minimum below to 12 inches above pipe shall be sand / cement slurry conforming to Paragraph 2.04 of this Section.

B. Pipe shall be supported on correct line and grade by concrete blocks and held-down by sandbags or other measures to prevent floatation, spaced as necessary but not to exceed 4-feet on center. Line and grade shall be confirmed by Licensed Surveyor prior to ordering slurry and after slurry has set up.

3.08 CONCRETE ENCASEMENT

A. Where concrete encasement is called for on the Drawings or is determined to be necessary during construction, pipe bedding and pipe zone backfill from 4 inches below to 6 inches above pipe shall be concrete.

B. Pipe shall be supported on correct line and grade by concrete blocks and held-down by sandbags or other measures to prevent floatation, spaced as necessary but not to exceed 4-feet on center. Line and grade shall be confirmed by Licensed Surveyor prior to ordering concrete and after slurry has set up.

3.09 TRENCH PLUGS

A. Where a trench plug is called for on the Drawings or is determined to be necessary during construction, a minimum 2-foot long excavation shall be made to 12 inches minimum below the trench bottom and into each trench wall. The excavation shall be backfilled with slurry cement per Paragraph 2.04 to 12" minimum above the top of the pipe zone sand.

3.10 EROSION AND SEDIMENTATION CONTROL

A. Contractor shall be responsible for control of erosion and sediment transport during the entire construction period and for any damage caused by erosion or sediment transport resulting from Contractor's operations.

B. When a Storm Water Pollution Prevention and Erosion / Sediment Control Plan (SWPP / ESC Plan) is included with the Drawing Set, implement and maintain erosion and sedimentation control measures in accordance with the Plan and Section 31 25 00 of these Specifications.

C. When a SWPP / ESC Plan is not included with the Drawing Set, develop, implement and maintain sedimentation and erosion control measures in accordance with Section 31 25 00 of these Specifications and with the ***Construction BMP Online Handbook,*** January 2015 edition, available online from the California Stormwater Quality Association.

3.11 PAVED SURFACE RESTORATION

A. NEW PAVEMENT

1. If trench surfacing is to be included with new pavement or reconstructed pavement, construct pavement structural section in accordance with the Drawings and Specifications.

B. PATCHED PAVEMENT

1. If trench surfacing is to be a patch within an existing A.C. or concrete paved surface to remain, construct as follows:

   a. Construct **final sawcut lines** 1-foot minimum beyond limits of trench and beyond any areas damaged by construction; **final sawcut lines** are in addition to those made for initial trench operations.

   b. Construct pavement structural section (thickness of aggregate base and surfacing) to match existing except where trench backfill is slurry cement which shall be carried to the bottom of A.C. or concrete surfacing.

   c. Unless waived by Owner's Representative, construct sealcoat over the full width of A.C. surfacing along the full length of the trench.

   d. Replace pavement markings and delineation in kind.

3.12 FIELD QUALITY CONTROL

A. Request observation by Owner's Representative after installation and assembly of, but before covering, piping.

B. Request observation and testing by the Construction-Phase Geotechnical Engineer of trench subgrade, bedding, pipe zone backfill, and trench backfill.

3.13 CONTAMINATED SOIL

A. If abandoned septic tanks or fuel tanks or other potential sources of contamination or hazardous waste are encountered or if soil which appears to be contaminated is encountered, immediately notify the Owner's Representative.

3.14 DUST CONTROL

A. Contractor shall be responsible for control of dust during the entire construction period and for any damage caused by dust resulting from Contractor's operations.

B. Employ all labor, equipment and methods required to prevent construction operations from producing dust in amounts damaging to persons, property, vegetation and animals or causing a nuisance to persons occupying buildings in the vicinity of the job site. Continue dust abatement measures until relief is granted by the Owner's Representative.

C. During times of earth disturbance or movement, monitor the amount of dust raised by the activity and water the areas being disturbed as needed to prevent dust from leaving the project site and to create a crust after each day's activities cease.

D. Impose a speed limit of 15 miles per hour for operation of construction vehicles on unpaved or disturbed areas.

E. Monitor the dust levels on access roads and apply water as needed to prevent dust from leaving the road access.

F. Ensure that trucks transporting material from the site are tarped before leaving the site with tarps sufficiently secure to remain tarped to the point of disposal.

G. Cover stockpiled soil materials as required to prevent wind-blown dust.

3.15 NOISE CONTROL

A. Keep noisy equipment as far as possible from the site boundaries.

B. Install stationary equipment in enclosures.

C. Install factory-standard silencing equipment on power-operated equipment.

3.16 TREE PROTECTION

A. Protect trees in accordance with Landscape Architect's requirements.

3.17 DISPOSAL

A. Remove from the work area, transport to a suitable off-site location, and legally dispose of all unsuitable soil materials, rubbish, and debris resulting from clearing, demolition, and grading operations.

B. Burning is not permitted within the work area.

Section continues on next page

3.18 SUBMITTAL REQUIREMENTS AND SCHEDULE

A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1, "Substitutions" section, for substitution requests.

Contractor's Initials:____ [Contractor is to acknowledge with initials each submittal included]

____ Letter of explanation attached for each submittal not included.

____ All submitted products are as specified.

B. SUBMITTAL SCHEDULE

____ 1. Submit sieve analyses for bedding and pipe zone backfill material.

____ 2. Submit Sand Equivalent analyses for bedding and pipe zone backfill material.

____ 3. Submit shoring calculations and details as may be required pursuant to Paragraph 3.04 of this Section.

END OF SECTION

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SECTION 31 25 00

CONSTRUCTION STORM WATER POLLUTION PREVENTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide materials, equipment and transportation and perform labor as required for installing, maintaining, repairing and, upon completion of construction, removing temporary storm water pollution prevention devices and collected pollutant material.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 10 00: Site Clearing

B. Section 31 20 00: Site Grading

C. Section 31 23 00: Trenching and Backfilling

1.04 STANDARD SPECIFICATIONS

A. Construction materials and methods shall be in accordance with the ***Standard Specifications for Public Works Construction,*** 2015 edition (SSPWC), published by Building News, Inc., except as modified or otherwise specified herein (hereinafter the Standard Specifications).

B. In case of conflict between the Standard Specifications and the Project Specifications, the Project Specifications shall govern.

1.05 REFERENCE SPECIFICATIONS

A. Where called for on the Drawings or in these Specifications, construction materials and methods shall be in accordance with ***Construction BMP Online Handbook,*** January 2015 edition, available online from the California Stormwater Quality Association.

B. In case of conflict between the Standard Specifications and a reference specification, the reference specification shall govern.

C. In case of conflict between a reference specification and these Project Specifications, the more stringent provision shall govern, as determined by the Owner's Representative and the Engineer.

1.06 REGULATORY REQUIREMENTS

A. Construction shall comply with the ***California Code of Regulations, Title 24.***

B. Contractor shall comply with the terms of the ***General Permit to Discharge Storm Water Associated with Construction Activity (WQ Order No. 99-08-DWQ).***

1.07 SUBMITTALS

A. Provide submittals according to the Conditions of the Contract and Division 1 "Submittal Procedures" section.

B. Refer to "Submittal Requirements and Schedule" near the end of this Section.

C. Prior to start of construction, execute ***Contractor's Storm Water Pollution Prevention Declaration*** contained at the end of this section and provide to District's Project Manager with copies to Architect and Engineer.

1.08 DOCUMENTS AT JOB SITE / RESPONSIBILITY FOR IMPLEMENTATION

A. Maintain at the job site a set of the contract document Plan Sheets specifically for purposes of recording thereon the locations, limits, and dates of installation for the various Storm Water Pollution Prevention (SWPP) Best Management Practice Measures (BMP's), over the course of construction.

B. Any Erosion / Sediment Control Plan or Pollution Control Site Map which may be included with the construction documents is based on the site being developed as depicted thereby when the Plan is implemented. These measures may not be suitable at all stages of construction and under all storm conditions, without modification and / or maintenance. Implementation of this Plan by Contractor shall not relieve Contractor of responsibility for construction site pollution control. Contractor shall employ all labor, equipment, materials and methods, shall make all modifications, and shall perform all maintenance necessary to prevent his / her operations from resulting in discharge of pollutants from the site.

1.09 MAINTAINING RECORDS

A. Generate and maintain the following records and, upon request, provide copies to the Owner's Representative; at the completion of construction, deliver these records to the Owner:

1. A log documenting the dates of installation, inspection, and maintenance of the various SWPP BMP's.

2. Photographs with dates imprinted thereon of the SWPP BMP's taken during installation, during inspections, and after maintenance.

B. ANNUAL REPORT

1. **Not Applicable.**

1.10 JOB SITE CONDITIONS

A. Contractor shall visit the site and shall familiarize himself with existing site conditions. Contractor shall make his own interpretations of site conditions and shall not be relieved of liability under the contract for any loss he may sustain as a result of any variance between conditions indicated by or deduced from said site visit and the actual conditions encountered during the progress of work.

B. Contractor shall assume sole and complete responsibility for job site conditions during the course of construction of this project including safety of all persons and property; this requirement shall apply continuously and not be limited to normal working hours.

C. Contractor shall assume sole and complete responsibility for protection of public and private property in the vicinity of the job site and shall, at Contractor's expense, repair or replace to original condition all existing improvements within or in the vicinity of the job site which are not designated for removal and which are damaged or removed as a result of Contractor's operations.

D. Contractor shall defend, indemnify and hold design professionals harmless from all liability and claims, real or alleged, in connection with the performance of work on this project, excepting liability arising from the sole negligence of design professionals.

E. Existing buried pipelines and conduits known to the preparer of the Drawings are shown on the Drawings. However, all such pipelines, conduits and structures may not be shown and the locations of those shown are approximate only and have not been independently verified by the preparer of the Drawings.

1. Contractor shall independently verify or determine the presence of existing buried pipelines, conduits and structures within the work area with the utility companies, the water and sanitary agencies, and the Owner. Before commencing work, Contractor shall determine the exact locations including depths of all existing underground pipelines, conduits and structures, including service connections, which may affect or be affected by his operations and shall mark these locations with paint or flags.

2. Contractor shall be fully responsible for any and all damages which might be occasioned by Contractor's failure to exactly locate and preserve any and all underground pipelines, conduits and structures.

3. Upon becoming aware of existing buried pipelines, conduits or structures not shown or located differently than shown on the Drawings, Contractor shall immediately notify the Owner's Representative and the owner of the pipeline, conduit or structure by telephone and in writing. If such pipeline, conduit or structure affects or is affected by the work, Contractor shall obtain written

permission and direction from the District and the owner of the pipeline, conduit or structure before proceeding with the work, excepting that in an emergency affecting safety of life, work or adjacent property, Contractor shall act at once without instructions to prevent injury or loss.

1.11 STORM WATER POLLUTION PREVENTION PLAN IMPLEMENTATION

A. ***Prior to start of construction,*** Contractor shall implement BMP's to address the following non-storm water issues which are related to Storm Water Pollution Prevention (SWPP). Contractor shall then maintain, monitor, and modify as necessary these same BMP measures throughout construction:

1. Material tracking off-site.
2. Equipment wash off, refueling and maintenance (if applicable).
3. Hazardous material storage (if applicable).
4. Concrete, paint, and plaster wash off / cleanup (if applicable).
5. Dewatering operations (if applicable).
6. Spill prevention and control.
7. Solid waste management.
8. Hazardous waste management.
9. Contaminated soil management.
10. Sanitary / septic waste management.
11. Liquid waste management.
12. Water conservation practices.
13. Illicit connection / discharge.
14. Potable water and irrigation water runoff / release.
15. Material delivery, storage and use.

B. ***Once ground disturbance has begun,*** Contractor shall implement, maintain and monitor BMP measures to address storm water related concerns for SWPP, including:

1. Wind erosion (dust) control.
2. Street sweeping and vacuuming.

3. Paving and grinding operations.

4. Concrete finishing (if applicable).

5. Silt fence and gravel bag berms when forecast of rain probability is 40% or greater.

6. Straw bale and sandbag barrier when forecast of rain probability is 40% or greater.

7. Storm drain inlet protection when forecast of rain probability is 40% or greater.

8. Fiber roll berm when forecast of rain probability is 40% or greater.

9. Temporary stream crossings or clear water diversions if water is flowing in the stream or when forecast of rain probability is 40% or greater.

10. Stockpile management when forecast of rain probability is 40% or greater.

C. Contractor shall implement, maintain and monitor other Best Management Practice measures (BMP's), as needed, on a case by case basis.

D. Contractor shall adapt the BMP measures throughout the construction period as necessary to address changing site conditions, construction materials, and construction methods to prevent the discharge of pollutants from the project site.

E. Contractor shall immediately address any deficiencies in implementation or adequacy of the BMP's identified by the Inspector or governing authority.

1.12 FINES

A. Failure of the Contractor to properly implement Best Management Practice measures for Storm Water Pollution Prevention, may result in fines being levied against the Santa Barbara School District (SBSD) by the State Regional Water Quality Control Board (SRWQCB) or other governing authority.

B. Contractor shall make full restitution to the SBSD for any and all fines levied against SBSD by the SRWQCB or other local, State or Federal agencies as a result of the Contractor's failure to maintain records or to implement, maintain and monitor BMP's.

PART 2 - MATERIALS

2.01 STABILIZED CONSTRUCTION ENTRANCE

A. STEEL PLATE / ROCK ENTRANCE

1. Material for roadbed shall be crushed rock, varying between 3 inches and 6 inches in largest dimension.

2. Geotextile fabric for placement between crushed rock and soil subgrade shall be Mirafi 140N non-woven polypropylene, or equivalent approved by the Engineer, suitable for soil separation and filtration.

3. Steel plates for rumble strip shall be 8'-minimum wide by 8'-minimum long plates suitable, unsupported, for H-20 traffic loading. Plates shall be supplied with continuous transverse steel ribs at 4"-maximum spacing; ribs shall be either ½ inch minimum thick by 2 inch minimum high bars or equal-leg 3 inch by 3 inch by ½" minimum thick angles, welded to plate.

B. CRUSHED ROCK ENTRANCE

1. Material for roadbed shall be crushed rock, varying between 3 inches and 6 inches in largest dimension.

2. Geotextile fabric for placement between crushed rock and soil subgrade shall be Mirafi 140N non-woven polypropylene, or equivalent approved by the Engineer, suitable for soil separation and filtration.

C. STEEL PLATE ENTRANCE

1. Steel plate entrance is for use on existing concrete or asphalt concrete paved areas only.

2. Steel plates for rumble strip shall be 8'-minimum wide by 8'-minimum long plates suitable, unsupported, for H-20 traffic loading. Plates shall be supplied with continuous transverse steel ribs at 4"-maximum spacing; cribs shall be either ½ inch minimum thick by 2 inch minimum high bars or equal-leg 3 inch by 3 inch by ½" minimum thick angles, welded to plate.

2.02 SILT FENCE

A. Silt fence fabric shall be a pervious sheet of synthetic polymer composed of at least 85% by weight ethylene, propylene, amide, ester, or vinylidene yarn, woven or non-woven; it shall contain stabilizers and/or inhibitors to resist deterioration by heat, water, and ultra-violet light. The fabric shall conform to the following criteria:

1. The equivalent opening size (U.S. standard sieve) shall be no larger than 70; where discharge would be to stream, lake, or wetland, E.O.S. shall be no larger than 100.

2. The required fabric tensile strength (per A.S.T.M. D-4632) shall be 120 pounds minimum with posts installed at 4-foot spacing.

B. Posts for supporting fence fabric shall be 3 x 3 wood or 1.33 pounds per linear foot steel with a minimum length of 42 inches. Steel posts shall have projections for attaching wire.

2.03 STRAW BALE DIKE / WEIR

A. Straw bales shall be standard size, bound with wire or nylon.

B. The straw bales shall be placed tightly against the ground or pavement surface and one another and shall be hand tamped firmly into place.

2.04 SILT TRAP AT DRAIN INLET

A. Silt trap fabric shall be a pervious sheet of synthetic polymer composed of at least 85% by weight ethylene, propylene, amide, ester, or vinylidene yarn, woven or non-woven; it shall contain stabilizers and / or inhibitors to resist deterioration by heat, water, and ultraviolet light. The fabric shall conform to the following criteria:

1. The equivalent opening size (U.S. Standard sieve) shall be no larger than 70; where discharge would be to stream, lake, or wetland, E.O.S. shall be no larger than 100.

2. The required fabric tensile strength (per A.S.T.M. D-4632) shall be 120 pounds minimum.

B. Where called for on the drawings, common clay bricks or solid masonry blocks shall be used to hold the fabric in place.

2.05 SANDBAG BARRIER

A. Sandbag shall be woven polypropylene, polyethylene or polyamide fabric having minimum unit weight of 4 ounces per square yard and mullen burst strength exceeding 300 pounds per square inch, in conformance with the requirements of ASTM Designation D3786, and having ultraviolet stability exceeding 70%, in conformance with the requirements of ASTM Designation D4355.

B. Each sand-filled bag should have a length of 18 inches, width of 12 inches, thickness of 3 inches, and mass of approximately 33 pounds. Bag dimensions are nominal.

C. All sandbag fill material shall consist of natural or manufactured granular material, or a combination thereof.

2.06 GRAVEL BAG FILTER

A. Gravel bags shall be woven polypropylene, polyethylene or polyamide fabric having minimum until weight of 4 ounces per square yard and mullen burst strength exceeding 300 pounds per square inch, in conformance with the requirements of ASTM designation

D3786, and having stability exceeding 70%, in conformance with the requirements of ASTM designation D4355.

B. Each gravel-filled bag should have a length of 18 inches, width of 12 inches, thickness of 3 inches and mass of approximately 33 pounds. Bag dimensions are nominal.

C. Gravel bag filled material should be 0.5 to 1 inch, clean crushed rock, free from clay, organic matter, and other deleterious materials.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. Contractor shall implement NPDES Permit Requirements including:

1. Reviewing the Storm Water Pollution Prevention Plan (SWPPP).

2. Amending the SWPPP to address changes in site conditions, construction materials, or construction operations that may affect the discharge of pollutants from the site.

3. Holding a mandatory training seminar with the general contractor's personnel, subcontractors' personnel, and material suppliers' personnel to explain the job requirements related to Storm Water Pollution Prevention; requiring those that attend to sign a training log indicating that they have attended the seminar and that they agree to implement and maintain the BMP's throughout construction.

4. Conducting weekly inspection and maintenance of the in-place BMP's.

5. Conducting inspections of the BMP's before each anticipated storm event and after each actual storm event; making the necessary repairs or modifications at the time of the inspection.

6. Ensuring full compliance with the Permit and implementing all elements of the Storm Water Pollution Prevention Plan, including elimination of all unauthorized discharges and preparation of an annual compliance evaluation.

B. The location and extent of the various BMP's shall be reviewed at the site by the DSA inspector at the beginning of the installation process. Provide 24 hours minimum notice.

C. The locations of the various BMP's may require adjustment due to changing site conditions and additional installations may be required by the inspector.

D. All BMP's shall be inspected and repaired at the end of each work week and, in addition, before and after each storm.

E. Pollutant deposits shall be removed from BMP's after each storm to restore their capacity. Soil material shall be stockpiled such that it cannot again result in sediment transport on- or off-site; other pollutants collected shall be remove from the site and disposed of in a proper and legal manner.

F. During the rainy season, the site shall be maintained such that no sediment or other pollutant-laden runoff enters the storm drainage system or flows offsite.

G. A standby crew shall be provided by the contractor for emergency work during rainstorms and shall remain onsite as needed to maintain BMP's during periods of precipitation.

3.02 STABILIZED CONSTRUCTION ENTRANCE

A. STEEL PLATE / ROCK ENTRANCE

1. Clear the existing ground surface of vegetation and debris and grade the roadbed and immediately downstream of the roadbed to provide positive and controlled drainage in accordance with the plan detail.

2. Place crushed rock over filter fabric.

3. Place steel plates.

B. CRUSHED ROCK ENTRANCE

1. Clear the existing ground surface of vegetation and debris and grade the roadbed and immediately downstream of the roadbed to provide positive and controlled drainage in accordance with the plan detail.

2. Place crushed rock over filter fabric.

C. STEEL PLATE ENTRANCE

1. Sweep clean the existing pavement surface beneath, to either side and immediately upstream and downstream prior to placing steel plates.

2. Place steel plates on top of the existing pavement, paying attention to prevent damage to the existing pavement and where applicable near by existing curbs, walls, etc.

3. Construct cold-mix A.C. conform patches to hold plates in place.

D. MAINTENANCE

1. Require that all employees, subcontractors, and suppliers utilize the stabilized construction entrance.

2. Inspect routinely to verify that steel plates have not moved out of place and that plate or crushed rock is not encroaching into sidewalk or other public right-of-way.

3. Remove soil collected between plate ribs and rock voids as necessary to prevent clogging, at least once a week, and prior to any storm event.

4. For Crushed Rock Entrance: remove, clean and replace rock or reconstruct as necessary to maintain effectiveness of entrance for removing soil from vehicles.

5. Inspect stabilized construction entrance daily and sweep tracked sediment as needed.

3.03 EROSION AND SEDIMENT CONTROL

A. GENERAL

1. Any Erosion / Sediment Control Plan which may be included with the construction documents is based on the site being developed as depicted thereby when the Plan is implemented. These measures may not be suitable at all stages of construction and under all storm conditions, without modification and / or maintenance. Implementation of this Plan by Contractor shall not relieve Contractor of responsibility for construction site erosion control measures. Contractor shall employ all labor, equipment, materials and methods necessary to prevent his / her operations from resulting in discharge from the site of silt (mud) and / or debris.

2. Erosion / sediment control measures shall be in place at anytime during the year when the forecast of rain probability is 40% or greater, for each year, until the site improvements, including grading, paving, drainage devices, and landscaping, have been constructed. Erosion / sediment control measures shall be inspected and repaired as necessary each week and before and after each storm.

3. The location and extent of erosion control measures shall be reviewed at the site by the inspector at the beginning of the installation process. Provide 24 hours minimum notice.

4. The locations of swales, erosion / sediment control berms, barriers, and silt fences may require adjustment due to changing site conditions and additional installations may be required by the inspector.

5. During the rainy season, all erosion / sediment control measures shall be inspected and repaired each week and before and after each storm.

6. Soil and debris deposits shall be removed from erosion control swales and from behind erosion / sediment control berms, barriers, and silt fences after each storm to restore their capacity. The spoil material shall be stockpiled such that it cannot again result in sediment transport on or off-site.

7. During the rainy season, all paved areas shall be kept clear of soil material and debris. The site shall be maintained such that no sediment-laden runoff enters the storm drainage system or sheet-flows offsite.

8. A standby crew shall be provided by the contractor for emergency work during rainstorms and shall remain onsite as needed to maintain BMP's during periods of precipitation.

B. SILT FENCE

1. The height of silt fence shall not exceed 24 inches above grade. On slopes, the fence line shall follow an elevation contour as closely as possible. Where crossing small swales, the fence line shall be curved upstream on each side to direct the flow towards the middle of the fence arc.

2. If possible, the filter fabric shall be cut from a continuous roll to avoid the use of joints. When joints are necessary, filter cloth shall be spliced only at a support post, with a minimum 6-inch overlap, with both ends securely fastened to the post.

3. Posts shall be spaced a maximum of 4 feet apart and be driven securely into the ground to a minimum depth of 12 inches. Subject to inspector's acceptance, chain link construction or permanent fencing may be used to support fabric in lieu of silt fence posts.

4. A trench shall be excavated approximately 6 inches in width and 6 inches in depth along the line of posts on the upslope side of the barrier.

5. Filter fabric shall be stapled or wired to the fence, and 12 inches of the fabric shall extend into the trench. The fabric shall not extend more than 24 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.

6. The location of silt fencing may require adjustment due to changing site conditions and additional installations may be required by the DSA inspector.

C. STRAW BALE DIKE / WEIR

1. Bales shall be placed in a row or as shown on the plan with ends tightly abutting.

2. Each bale shall be embedded in the soil a minimum of 4 inches.

3. Bales shall be securely anchored in place by two stakes driven through the bales. The first stake in each bale shall be driven toward the previously laid bale to force bales together.

4. The locations of straw bale dikes / weirs may require adjustments due to changing site conditions and additional installations may be required by the DSA inspector.

D. SILT TRAP AT DRAIN INLET

1. For larger inlets having steel or cast iron grates, the fabric shall be installed between the frame and grate and then the grate reseated to secure the fabric in place. The fabric panel used to cover the inlet shall be a minimum of 12" larger in square dimension or in diameter than the grate.

2. For smaller inlets, the fabric shall be centered over the in-place grate and held down with bricks or solid masonry blocks. The fabric panel size used to cover the inlet shall be a minimum of 24" square or in diameter.

3. The filter fabric shall be cut from a continuous roll, as no joints will be allowed.

E. SANDBAG BARRIER

1. The height of the sandbag barrier shall be approximately 6", or two bags.

2. The sandbags shall be placed tightly against the ground or pavement surface and one another and shall be hand tamped into place.

F. GRAVEL BAG FILTER

1. The height of the gravel bag filter shall be approximately 3", or one bag.

2. The gravel bags shall be placed tightly against the ground or pavement surface and one another and shall be hand tamped into place.

G. MAINTENANCE

1. SILT FENCE

a. Silt fences shall be inspected each week, before a storm, periodically during rainfall, and after each storm. Any required repairs shall be made immediately.

b. Should the fabric on a silt fence decompose or become ineffective during the time the fence or barrier is still necessary, the fabric shall be replaced immediately.

c. Sediment deposits (spoils) shall be removed when depth of deposits reach approximately one-half the height of the silt fence (12-inches maximum) and after each storm. Sediment buildups must be removed when bulges develop in the fence regardless of depth of deposition.

2. STRAW BALE DIKES / WEIRS

a. Straw bale dikes / weirs shall be inspected each week, before a storm, periodically during rainfall, and after each storm. Any required repairs shall be made immediately.

b. Should the straw bales decompose or become ineffective during the time the devices are still necessary, they shall be replaced immediately.

c. Sediment deposits shall be removed when deposits reach approximately one-half the height of the dike / weir.

3. SILT TRAPS AT DRAIN INLET

a. Silt traps shall be inspected each week, before a storm, periodically during rainfall, and after each storm. Any required maintenance or repair shall be made immediately.

b. Sediment deposits (spoil) and other debris trapped on the fabric shall be removed as necessary during rainfall to maintain inflow to the drain inlet.

c. Should the silt trap fabric decompose or become ineffective during the time the devices are still necessary, it shall be replaced immediately.

4. SANDBAG BARRIER

   a. Sandbag barrier shall be inspected each week, before a storm, periodically during rainfall, and after each storm. Any required repairs shall be made immediately.

   b. Should the fabric of the sandbag decompose during the time the barrier is still necessary, the sandbag shall be removed and replaced immediately. Sandbags exposed to sunlight will need to be replaced every two to three months.

   c. Washouts or other damage shall be repaired immediately.

   d. Sediment and debris that accumulate behind the sandbag barrier must be periodically removed in order to maintain the barrier effectiveness. Materials should be removed when the accumulation reaches one third of the barrier height.

5. GRAVEL BAG FILTERS

   a. Gravel bag filters shall be inspected each week, before storm, periodically during rainfall, and after each storm. Any required repairs shall be made immediately.

   b. Should the fabric of the gravel bag decompose during the time the filter is still necessary, the gravel bag shall be removed and replaced immediately. Gravel bags exposed to sunlight will need to be replaced every two to three months.

   c. Washouts or other damage shall be repaired immediately.

   d. Sediment and debris that accumulates behind the gravel bag filter must be periodically removed in order to maintain the filter effectiveness. Material should be removed when the accumulation reaches one third of the filter height.

6. Spoil material shall be disposed of off-site at an appropriate disposal facility. During construction, the soil material may be temporarily stockpiled on-site in such a manner that it cannot again result in sediment transportation on or off-site.

3.04 POLLUTION CONTAINMENT AREA

A. EARTH BERM

1. Develop containment area by constructing earth berms in accordance with the plan detail. Onsite soil free of organic material and rocks larger than 1" in diameter may be used for the earth berms.

2. Grade the area outside of the earth berms to direct storm runoff away from the containment area.

B. STRAW BERM

1. Sweep clean the existing pavement surface within the containment area, to either side and immediately upstream and downstream prior to constructing the containment berms.

2. Develop containment area by constructing straw bale and sandbag berms in accordance with the plan detail.

C. MAINTENANCE

1. Routinely inspect the containment structure (berm) to ensure that it is intact and provides the required freeboard. Provide additional materials and reform or replace the berm as necessary to maintain its integrity.

2. Regularly remove and properly dispose of offsite all pollutants deposited within the containment area, in accordance with all applicable local, state and federal laws.

3.05 DISPOSAL

A. Remove from the work area, transport to a suitable off-site location, and legally dispose of all unsuitable soil materials, rubbish, debris and other pollutants resulting from construction operations.

B. Burning is not permitted within the work area.

3.06 PROJECT COMPLETION

A. Upon completion of the project, including landscaping and site cleanup, and in a timely manner:

1. Submit to the District the Records listed in Subsection 1.09.

Section continues on next page.

3.07 SUBMITTAL REQUIREMENTS AND SCHEDULE

A. Include this form with submittals of these Specification section.

Contractor's Initials:____ [Contractor is to acknowledge with initials each submittal included]

____ Letter of explanation attached for each submittal not included.

____ All submitted products are as specified.

B. SUBMITTAL SCHEDULE

____ 1. Submit manufacturer's product data indicating tensile strength and E.O.S. for silt fence / silt trap fabric.

____ 2. Submit material type and dimensions for silt fence posts.

____ 3. Submit manufacturer's product data indicating burst strength, ultra violet stability and permeability for sandbags and gravel bags.

____ 4. Submit sieve analysis for gravel bag fill material.

Section continues on next page.

3.08 CONTRACTOR'S STORM WATER POLLUTION PREVENTION DECLARATION

A. As Contractor for this project, we hereby declare as follows:

1. We understand it is our responsibility to construct and maintain pollution prevention measures, including those for erosion and sediment control, as necessary to prevent any pollutant at any level from being conveyed off the construction site and that these measures must continue to be maintained until the required post-construction pollution prevention measures are in place and completely functional, including permanent landscaping.

2. We understand that site development and storm characteristics will evolve over the course of construction and that it is our responsibility to not only implement storm water pollution prevention measures, but to make adjustments and expansion in the implementation as necessary to adapt to our construction operations and schedule and to address evolving site conditions and actual weather conditions.

3. We understand it is our responsibility to train employees and subcontractors regarding these requirements and to maintain records of the installation, modification, inspection, and maintenance of storm water pollution prevention measures including, but not limited to: training, inspection, maintenance logs; record drawings showing locations, limits, and dates of installation for various measures; dated photographs and field sketches.

4. We are familiar with and agree to implement best management practice storm water pollution prevention measures including installation, routine inspection and maintenance, adjustments and expansion due to evolving site conditions, emergency maintenance and adjustments due to actual storm and site conditions, and documentation.

_____

CONTRACTOR (FIRM) LICENSE NO.

_____ _____

(AUTHORIZED SIGNATURE) DATE

B. Contractor shall execute this Declaration and provide to District's Project Manager, with copies to Architect and Engineer, prior to start of construction.

END OF SECTION

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SECTION 321214 - SUBGRADE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes, but is not necessarily limited to the work necessary for the preparation of the subgrade.

1.2 RELATED WORK DESCRIBED ELSEWHERE

A. All underground work contemplated in the area of the subgrade shall be completed and properly backfilled before subgrade work is started.

B. These Specifications are to be used in conjunction with requirements in those sections of the Specifications having to do with specific types of base materials and pavements.

1. Section 017320 Selective Demolition
2. Section 311000 Site Clearing
3. Section 312000 Earth Moving
4. Section 321215 Aggregate Base
5. Section 321216 Asphalt Concrete Paving
6. Section 321313 Concrete Paving

PART 2 - PRODUCTS

2.1 EXCAVATION

A. The excavation shall include removal of materials which are encountered in excavating to the required grades, including existing pavement and curbs designated to be removed, or as required to accomplish the construction.

2.2 EQUIPMENT

A. Furnish equipment to accomplish the excavating, shaping, grading and rolling, and compaction.

PART 3 - EXECUTION

3.1 SUBGRADE

A. Excavate and shape subgrade to line, grade, and cross section. Roll subgrade with a roller until the top 12 inches is compacted to 95 percent of maximum density at optimum moisture content as determined by ASTM D 1557. Remove unsuitable material disclosed by the rolling and replace with suitable material from the excavation. Fill holes, and depressions which develop under the roller,

to the required grade and cross sections with material from the excavation. The finished subgrade shall be within a tolerance of plus or minus 0.10 of a foot of the grade and cross section shown, shall be smooth and free from irregularities and at the specified density. Compaction shall extend one foot beyond the edge of paving, curb, or form work.

B. The Contractor shall be responsible for the protection of existing improvements; any damage resulting from his operations shall be the Contractor's sole responsibility.

3.2 EXCAVATION BELOW GRADE

A. Where the Geotechnical Engineer deems subgrade material to be unsatisfactory, excavation below grade will be required to such depths as necessary to remove the unsatisfactory material. Excavation below grade shall be of the same classification as that above it provided it is removed in the same operation as the normal excavation. Where the Contractor has completed the excavation and is required to remove additional, unsuitable material beyond the scope provided in these specifications, or where the additional depth requires special equipment because of unforeseen conditions, the work shall be performed and a payment for excavation below grade will be made on the basis of extra work as provided in the Contract.

B. If the excavation below grade is required because of negligence on the part of the Contractor, the necessary excavation below grade and the backfilling required to restore the surface satisfactorily shall be at the Contractor's sole expense.

C. The subgrade shall be sprinkled with water as required, and in such quantities as necessary, to obtain the specified compaction.

3.3 PROTECTION OF SUBGRADE

A. After preparing the subgrade as above specified, traffic shall be kept off. Should it be found necessary to haul over the prepared subgrade, the Contractor shall drag and roll the traveled way as frequently as may be necessary to remove ruts, cuts, and breaks in the surface. Cuts, ruts, and breaks in the surface of the subgrade that are not removed by the above operations shall be raked and hand-tamped. Equipment used for transporting materials over the prepared subgrade shall be equipped with pneumatic tires.

B. Continued use of sections of prepared subgrade for hauling, so as to cut up or deform it from the true cross section, will not be permitted. The Contractor shall protect the prepared subgrade from both construction and public traffic.

C. The subgrade shall be maintained in the finished condition until the first succeeding course is placed.

SECTION 32 13 13
CONCRETE PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide Portland cement concrete paving .

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Section 321600 - Concrete Curbs, Gutters and Sidewalks

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are trained and experienced in the necessary crafts and who are familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Do not commence placement of concrete until mix designs have been reviewed, and until copies of the final mix designs are at the job site and the batch plant.

C. Provide access for, and cooperate with, the inspector and testing laboratory described in Section 014000 – Quality Requirements.

1.4 REGULATORY REQUIREMENTS

A. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Sections 11B-302 and 11B-403.

PART 2 - PRODUCTS

2.1 FORMS

A. Forms shall be made of wood or metal or other material capable of supporting mechanical concrete placing equipment without settling vertically, bowing inward or outward, or crushing. Forms shall have sufficient rigidity to maintain the lines and grades shown on the Drawings within a vertical tolerance of 0.05 feet and an alignment tolerance of 1 inch at any point. Forms shall be clean and free of dirt, rust, and hardened concrete.

B. Earth forms are not permitted for paving.

2.2 REINFORCEMENT

A. Comply with the following as minimums:

1. Bars: ASTM A615, grade 60,
2. Welded wire fabric: ASTM A185.
3. Bending: ACI318.

B. Fabricate reinforcement to the required shapes and dimensions, with fabrication tolerances complying with the CRSI "Manual of Standard Practices". Do not use reinforcement having any of the following defects:
   1. Bar lengths, depths, or bends exceeding the specified fabricating tolerances;
   2. Bends or kinks not indicated on the Drawings or required for the work;
   3. Bars with cross-section reduced due to excessive rust or other causes.

C. Joint reinforcement:
   1. Dowel bars shall be plain bars.
   2. Tiebars shall be deformed bars.
   3. Dowel bars and tiebars shall be of sizes indicated in the Project Drawings.

2.3 CONCRETE

A. Comply with the following as minimums:
   1. Portland cement: ASTM C150, type I or II, low alkali.
   2. Aggregate, general:
      a. ASTM C30, uniformly graded and clean;
   3. Aggregate, coarse: Crushed rock or washed gravel with maximum size between ¾" and 1-1/2", and with minimum size number 4.
   4. Aggregate, fine: Natural washed sand of hard and durable particles varying from fine to particle passing a 3/8" screen, of which at least 12% shall pass a 50-mesh screen.
   5. Water: Clean and potable.
   6. 4" Max Slump
   7. W/CM Ratio of equal or less than 0.52
   8. Air-Entraining Ad Mixture shall meet ASTM C260, and shall be between 4 and 8 percent.

B. Use only such additives as are recommended in the mix design

2.4 MEMBRANE-FORMING CURING COMPOUNDS

A. Comply with ASTM C 309, Type 2, Class A.

2.5 ISOLATION JOINT MATERIAL

B. Comply with ASTM D 1751 or ASTM D 1752.

2.6 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper elimination of the work. Do not proceed until satisfactory conditions are corrected.

3.2 FINAL PREPARATION OF SUBGRADES

A. After preparation of subgrade as specified in Section 321214 - Subgrade and Roadbed, thoroughly scarify and sprinkle the entire area to be paved, and then compact to a smooth, hard, even surface of 95% compaction to receive the aggregates.

3.3 PLACEMENT OF BASE COURSE

A. Base:
   1. Spread the specified coarse aggregate to a thickness providing the compacted thickness shown on the Drawings or 4 inch thick if not shown.
   2. Compact to 95%.
B. Thickness Tolerance: Provide the compacted thickness within a tolerance of minus 0.0" to plus 0.5".
C. Smoothness tolerance: Provide the lines and grades shown on the Drawings within a tolerance of 0.05 feet vertically and 1 inch in alignment at any point.
D. Correct deviations by removing materials, replacing with new materials, and reworking or recompacting.
E. Use only the amount of moisture needed to achieve the specified compaction.

3.4 INSTALLATION

A. Upon completion of base course and formwork, install reinforcement.
   1. Clean reinforcement to remove loose rust and mill scale, earth, and other materials that reduce bond or destroy bond with concrete.
   2. Position, support, and secure reinforcement against displacement by formwork, construction, and concrete placement operations.
   3. Place reinforcement to obtain the required coverages for concrete protection.

B. Transmit mix the concrete in accordance with provisions of ASTM C94.
   1. With each load, provide ticket certifying to the materials and quantities and to compliance with the mix design.
   2. On the transit-mix ticket, state the time water was first added to the mix.
   3. At the batch plant, withhold 2-1/2 gal of water per cu yd of concrete.
   4. Upon arrival at the job site, and as directed by the testing laboratory inspector, add all or part of the withheld water before the concrete is discharged from the mixer.
   5. Mix not less than five minutes after the withheld water has been added, and not less than one minute of that time immediately prior to discharge of the batch.
   6. Provide 15 minutes total mixing time per batch after first addition of water.

C. Do not use concrete that has stood over 30 minutes after leaving the mixer, or concrete that is not placed within 60 minutes after water is introduced into the mix.

D. Conveying:
   1. Place concrete in accordance with the following and pertinent recommendations contained in ACI 304.
   2. Deposit concrete continuously in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause formation of seams or places of weakness within the section.
   3. If a section cannot be placed continuously, provide construction joints as specified herein.
   4. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic.
   5. Deposit concrete as nearly as practicable in its final location so as to avoid segregation due to rehandling and flowing.
   6. Do not subject concrete to any procedure which will cause segregation.
   7. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated to foreign materials.
   8. Remove any rejected concrete from the site.

E. Deposit and consolidate concrete in a continuous operation within the limits of construction joints until the placing of a panel or section is completed.
   1. Bring surfaces to the correct level with a straightedge, and then strike off.
   2. Use bullfloats or darbies to smooth the surface. Do not disturb the surfaces prior to start of finishing operations.

F. Finishing:
   1. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation.
   2. During or after the first floating, check the planeness of surface with a ten foot straightedge applied at not less than two different angles.
   3. Cut down high spots and fill low spots, and produce a surface level within ¼" in two feet as determined by a two foot straightedge placed anywhere on the surface in any direction.
   4. Re-float the surface immediately to a uniform sandy texture.
   5. While the surface is still plastic, provide a textured finish by drawing a fiber bristle broom uniformly over the surface.
      a. Unless otherwise directed by the Architect, provide the texturing in one direction only.
      b. Provide "light", "medium", or "coarse" texturing as directed by the Architect.

3.5 JOINTING

A. Construct joints at locations, depths, and with dimensions indicated on the Project Drawings.

B. The Contractor shall submit drawings describing jointing requirements:
   1. Indicate locations of all contraction joints, construction joins, and isolation joints. Locate joints at 12 feet on-center.
   2. The larger dimension of any panel shall not exceed 125 percent of the smaller dimension.
   3. The minimum angle between any two intersecting joints shall be 80 degrees.

4. Joints shall intersect pavement free edges at a 90 degree angle and shall extend straight for a minimum of 1.5 feet from the pavement edge
5. Align joints of adjacent panes. Align joints in attached curbs with joints in pavement.
6. Describe joint depths, widths, and keyway dimensions.
7. Use isolation joints only where pavement abuts buildings, foundations, manholes, and other fixed objects.

C. Construct contraction joints by one of the following methods:
1. Insert plastic strips vertically into the fresh concrete. Depress strips into pavement until flush with surface.
2. Saw-cut concrete after concrete has hardened sufficiently to prevent aggregate being dislodged and soon enough to control pavement cracking. If contraction joint sawing causes a crack, discontinue sawing that contraction joint and continue sawing other contraction joints.

D. Isolation joints:
1. Extend isolation joints through the full depth of the pavement. Fill the entire isolation joint with isolation joint material.
2. Do not permit reinforcement to extend continuously through any expansion joint.
3. Locate isolation joints at all beginning and ending of curves, filled to full depth with expansion joint material.
4. In curbs, locate ½" thick joint at the beginning and end of curves, and at a maximum of 40' centers elsewhere unless otherwise shown on the plans.
5. In curbs and paving, hold down ½" and seal exposed joints with a joint sealer.

3.6 CURING AND PROTECTION

A. Beginning immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.

B. Apply membrane-forming curing compound to all exposed surfaces at a maximum coverage rate of 200 sq.ft./gal. Apply curing compound immediately after final surface texture has been obtained and water sheen has disappeared. Apply curing compound to pavement edges after forms have been removed.

C. Alternate curing methods may be used when specified and approved by the engineer.

3.7 TOLERANCES

A. The entire site is subject to frequent pedestrian traffic, and is subject to the guidelines presented in the Americans with Disabilities Act. Where stated on plans or where required by the ADA, the slopes are not to exceed the maximums set forth in this act.

END OF SECTION

SECTION 321600 - CONCRETE CURBS, GUTTERS AND SIDEWALKS

PART 1 - GENERAL

1.01 Description

A. Section Includes: Concrete curbs, gutters and sidewalks.
B. Related Work:
   1. Section 321313 Concrete Paving
   2. Section 321215 Aggregate Base

1.02 Submittals

A. Submit Product Information and Mix Design, Certification, Test Results, and Source of Expansion Joint Filler.

PART 2 - PRODUCTS

2.01 Forms

A. Materials for curb and gutter shall be 2-inch dressed dimension lumber or of metal of equal strength, free from defects which would impair the appearance or structural quality of the completed curb. Where short- radius forms are required, 1-inch dressed lumber or plywood may be used. Form material for the face of the curb shall not have any horizontal joints closer than seven inches from the top of the curb. Provide stakes and bracing materials as required to hold forms securely in place.
B. Materials for sidewalks shall be 2-inch dressed dimension lumber, straight and free of defects, or standard metal forms. Where short radius forms are required, 1-inch dressed lumber of plywood may be used. Provide stakes and bracing material as required to hold forms securely in place.

2.02 Crushed Rock Base

A. Clean 3/4 inch minus crushed rock or crushed gravel, free from foreign material and meeting the requirements of Section 321215 – Aggregate Base.

2.03 Expansion Joint Filler

A. Expansion joint filler shall be 1/2 inch thick, premolded joint filler material. It shall consist of premolded strips of a durable resilient material. Premolded joint filler shall be one of the following:
   1. Preformed Expansion Joint Filler (Bituminous) conforming to ASTM D 994.

2. Nonextruding and Resilient Filler (Bituminous) conforming to ASTM D 1751.

2.04 Concrete

A. Concrete shall be ready-mixed, conforming to ASTM C 94, Alternate 2, and shall have a compressive strength of 3,000 psi at 28 days. Maximum size of aggregate shall be 1-1/2 inch. Slump shall be between two and four inches. Submit complete information regarding mix to the Engineer for review, in accordance with the requirements of the referenced ASTM Specifications.

2.05 Curing Compound

A. Liquid membrane-forming curing compound shall be clear or translucent, suitable for spray application and shall conform to ASTM C 309, Type 1.

PART 3 - EXECUTION

3.01 Excavation and Backfill

A. Perform all excavation and backfill required to accomplish the construction. After concrete forms have been removed and all debris cleaned up from the areas to be filled, place backfill from excavation in six inch lifts to grade and compact each lift thoroughly with pneumatic tamper or other suitable equipment to prevent future settlement. Dispose of all excess excavation offsite.

3.02 Preparation of Subgrade

B. Bring the area on which curbs, gutters and sidewalks to be constructed to required grade on undisturbed ground and compact by sprinkling and rolling or mechanical tamping. As depressions occur, refill with suitable material and recompact until the surface is at the proper grade. Subgrade shall be compacted to 95% of maximum density at optimum moisture content as determined by ASTM D 1557, Method C.

3.03 Setting Forms

A. Construct forms to the shape, lines, grades and dimension called for on the Drawings. Stake wood or steel frames securely in place, true to line and grade.
B. Forms on the face of the curb shall not have any horizontal joints within seven inches of the top of the curb. Brace forms to prevent change of shape or movement in any direction resulting from the weight of the concrete during placement. Construct short-radius curved forms to exact radius.

Tops of forms shall not depart from gradeline more than 1/8 inch when checked with a 10 foot straight edge. Alignment of straight sections shall not vary more than 1/8 inch in 10 feet.

3.04 Curb Construction

A. Place preformed asphalt-impregnated expansion joints at intervals not exceeding 40 feet and at the beginning and end of curved portions of the curb; also at connections to existing curbs.
B. Place weakend plane joints in the curb at intervals not exceeding 10 feet. Place, process, finish and cure concrete in accordance with the applicable requirements of ACI 614, and this Specification. Wherever the requirements differ, the higher shall govern. After initial set has occurred in the concrete and prior to removing the front curb form, the steel sheet shall be removed with a sawing motion. Finish top of curb with a steel trowel and finish edges with a steel edging tool.
C. As soon as the concrete has set sufficiently to support its own weight, remove the front form and finish all exposed surfaces. Finish formed face by rubbing with a burlap sack or similar device that will produce a uniformly textured surface, free of form marks, honeycomb and other defects. All defective concrete shall be removed and replaced at the Contractor's sole expense. Upon completion of the finishing, apply acuring compound to exposed surfaces of the curb. Curing shall continue for a minimum of five days.
D. Upon completion of the curing period, but not before seven days has elapsed since pouring the concrete, backfill the curb with earth, free from rocks two inches and larger and other foreign material. Tamp backfill firmly in place.
E. Finished curb shall present a uniform appearance for both grade and alignment. Remove any section of curb showing abrupt changes in alignment or grade, or which is more than 1/4 inch away from its location as staked, and construct new curb in its place at the Contractor's sole expense.

3.06 Sidewalk Construction

A. Sidewalks shall be a minimum of four inches thick in walk areas and six inches thick in driveway areas.
B. At locations where the new sidewalk is to abut existing concrete, sawcut concrete for a depth of two inches and chip the old concrete back to sound material on a straight line, clean the surface, and apply a neat cement paste just prior to pouring the new sidewalk.
C. Place preformed asphalt expansion joints as in the adjacent curb, where the sidewalk ends at a curb, and around posts, poles, or other objects protruding through the sidewalk.
D. Provide weakend plane joints transversely to the walks at locations opposite the contraction joints in the curb. Plastic pulltop quickjoint strips or equal at 1-1/2 inch deep

E. Place, process, finish and cure concrete in conformance with the applicable requirements of ACI 614 and this Specification. Where the requirements differ, the higher shall govern.

F. At a minimum, broom the surface with a fine-hair broom at right angles to the length of the walk and tool at all edges, joints and markings or surface finish. Mark the walks transversely at five-foot intervals with a jointing tool. Upon completion of the finishing, apply a curing compound to the exposed surfaces. Protect the sidewalk from damage for a period of seven days.

END OF SECTION

SECTION 32 31 20

CHAIN-LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Chain-Link Fences: Industrial.
   2. Gates: Horizontal Slide

B. Related Section s include the following:
   1. Division 3 Section "Cast-in-Place Concrete" for concrete post concrete fill.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 12 feet high, and post spacing not to exceed 10 feet.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
   1. Fence and gate posts, rails, and fittings.
   2. Chain-link fabric, reinforcements, and attachments.
   3. Gates and hardware.

B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, swing gate,, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post

anchorage, attachment, bracing, and other required installation and operational clearances.

C. Samples for Initial Selection: Manufacturer's color charts or 6-inch lengths of actual units showing the full range of colors available for components with factory-applied color finishes.

D. Samples for Verification: For each type of chain-link fence and gate indicated.
   1. Polymer-coated steel wire (for fabric) in 6-inch lengths.

E. Product Certificates: For each type of chain-link fence, and gate, signed by product manufacturer.
   1. Strength test results for framing according to ASTM F 1043.

F. Qualification Data: For Installer.

G. Maintenance Data: For the following to include in maintenance manuals:
   1. Polymer finishes.

1.5 QUALITY ASSURANCE

A. Reference Standards:
   1. 2019 Building Standards Administrative Code, Part 1, CBSC.
   2. 2019 California Building Code (CBC), Part 2, CBSC (2015 IBC & California Amendments).
   3. 2019 California Fire Code, Part 9, CBSC (2015 International Fire Code & California Amendments).
   4. 2019 California referenced Standards, Part 12 CBSC.
   5. Title 19 C.C.R., Public Safety, SFM Regulations.
   6. Americans with Disabilities Act (ADA), Title II or Title III.

B. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

B. Interruption of Existing Utility Service: Do not interrupt utility services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect no fewer than 2 days in advance of proposed interruption of utility services.
   2. Do not proceed with interruption of utility services without Architect's written permission.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of chain-link fences and gates that fails in materials or workmanship within specified warranty period.
   1. Warranty Period: 2 years.

B. Installer's Warranty: 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Chain-Link Fences and Gates: Subject to compliance with requirements, provide products by one of the following.
   1. Ameristar.
   2. Master-Halco.
   3. Anchor Fence.
   4. Merchants Metals.
   5. Or equal.

2.2 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:
   1. Steel Wire Fabric: Polymer-coated wire with 9 gage (0.144 inches) core thickness.
      a. Mesh Size: 2 inches.
      b. Weight of Metallic (Zinc) Coating: ASTM A 392, Type II, Class 2, 2.0 oz./sq. ft. with zinc coating applied after weaving.
      c. Polymer Coating:
         1) Permafused II by Master Halco or equal.

2) ASTM D 668, Class 2b, fluidized PVC bonded and cured onto metallic-coated steel wire.
3) Color: As selected by Architect from manufacturer's full range, complying with ASTM F 934.

2. Selvage: Knuckled at both selvages.

2.3 INDUSTRIAL FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framing, and the following:
1. Group: Group IC round high yield pipe, ASTM F 1043, domestic (not imported) Deluxe Quality (DQ-40) Industrial (not Schedule 40).
2. Fence Height: As indicated on Drawings.
3. Strength Requirement: Heavy industrial according to ASTM F 1043.
4. Post Diameter and Thickness:
a. Top and Bottom Rail: 1-5/8 inch O.D. (nominal 1-1/4 inch).
b. Terminal Post (Corner, End, and Gate Post): 2-7/8 inch O.D. (nominal 2-1/2 inch).
c. Line and Brace Rail: 1-7/8 inch O.D. (nominal 1-1/2 inch).
d. Swing Gate Members: 1-7/8 inch O.D. (nominal 1-1/2 inch).
e. Horizontal-Slide Gate Post: [**According to ASTM F 1184.**]

1) Openings up to 12 Feet Steel post, 2.875-inch diameter, and 4.64-lb/ft. weight.
2) Openings Wider Than 12 Feet Steel post, 4-inch diameter, and 8.65-lb/ft. (weight.
3) Guide posts for Class 1 horizontal-slide gates equal the gate post height, 1 size smaller, but weight is not less than 3.11 lb/ft. installed adjacent to gate post to permit gate to slide in space between.

f.
5. End and Corner Post Top: Dome.
6. Coating for Steel Framing:
a. Metallic Coating:
1) Type A, consisting of not less than minimum 2.0-oz./sq. ft. average zinc coating per ASTM A 123 or 4.0-oz./sq. ft. zinc coating per ASTM A 653.
2) Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
3) External, Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film. Internal, Type D, consisting of 81 percent, not less than 0.3-mil- thick, zinc pigmented coating.

4) Type C, Zn-5-Al-MM alloy, consisting of not less than 1.8-oz./sq. ft. coating.
5) Coatings: Any coating above.

b. Polymer coating over metallic coating.

2.4 TENSION WIRE

A. General: Provide horizontal tension wire at the following locations:
1. Location: Extended along bottom of fence fabric and along top when either top or bottom rails are not indicated on Drawings.

B. Metallic-Coated Steel Wire: Minimum 0.177-inch- diameter, marcelled tension wire complying with ASTM A 817, ASTM A 824, and the following:
1. Metallic Coating: Matching chain-link fabric coating type and weight.

2.5 FITTINGS

A. General: Comply with ASTM F 626.

B. Post and Line Caps: Provide for each post.
1. Line post caps with loop to receive tension wire or top rail.

C. Rail and Brace Ends: Attach rails securely to each gate, corner, pull, and end post.

D. Rail Fittings: Provide the following:
1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.

E. Tension and Brace Bands: Pressed steel.

F. Tension Bars: Steel, length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.

G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.

H. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
a. Hot-Dip Galvanized Steel: 0.148-inch- diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.

I. Finish:
   1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.
   2. Polymer coating over metallic coating.

2.6 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

2.7 POLYMER FINISHES

A. Supplemental Color Coating: In addition to specified metallic coatings for steel, provide fence components with polymer coating.

B. Metallic-Coated Steel Tension Wire: PVC-coated wire complying with ASTM F 1664, Class 2b.

C. Metallic-Coated Steel Framing and Fittings: Comply with ASTM F 626 and ASTM F 1043 for polymer coating applied to exterior surfaces and, except inside cap shapes, to exposed interior surfaces.
   1. Polymer Coating: Not less than 10-mil- thick PVC or 3-mil- thick polyester finish.

D. Color: Match chain-link fabric, complying with ASTM F 934.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance.
   1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

3.4 CHAIN-LINK FENCE INSTALLATION

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
   1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
   2. Concrete Fill: Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
      a. Hole diameter dug or drilled minimum 4 times largest cross section of post and minimum depth of 24 inches plus additional 3 inch for each 1 feet increase in fence height over 4 feet.
      b. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.

C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.

D. Line Posts: Space line posts equidistant at intervals not exceeding 10 feet o.c unless otherwise indicated.

E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.
   1. Locate horizontal braces at midheight of fabric 6 feet or higher, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.
   1. Top Tension Wire: Install tension wire through post cap loops.
   2. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.

G. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

H. Bottom Rails: Install, spanning between posts.

I. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inches between finish grade or surface, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.

K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
   1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.

L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.5 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.6 ADJUSTING

A. Gate: Adjust gate to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

END OF SECTION

SECTION 321215 - AGGREGATE BASE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This section covers the materials and work necessary for construction of aggregate base.

B. Related Sections:
   1. Section 321214 Subgrade and Roadbed.
   2. Section 321216 Asphalt Paving
   3. Section 321313 Concrete Paving
   4. The geohazard and geotechnical investigation reports: None.

1.2 SUBMITTALS

A. Samples and Testing: At least thirty (30) days prior to the use thereof, the Contractor shall submit to the Geotechnical Engineer a sample of aggregate, graded as intended for use. Provide sample size as directed by the Geotechnical Engineer, not to exceed 120 lbs. This requirement shall be complied with for each aggregate and grading thereof that has not been reviewed. The Geotechnical Engineer will test the sample at no cost to the Contractor, and will determine the acceptability of the aggregate.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate: The aggregate shall be free from vegetable matter and other deleterious substances. Aggregate for aggregate base shall consist of material of which at least 60 percent by weight shall be crushed particles as determined by Test Method No. Calif. 205.
   1. The percentage composition by weight of aggregate base shall conform to one of the following gradings when determined by Test Method No. Calif. 202.

2. The particle size distribution shall be in accordance with the grading specified for 3/4-inch maximum size aggregate.

	Percentage Passing	
	1-1/2"	3/4"
Sieve Size	Maximum	Maximum
2-Inch	100	
1-1/2-Inch	90-100	
1-Inch		100
3/4-Inch	50-85	90-100
No. 4	25-45	35-60
No. 30	10-25	10-30
No. 200	2-9	2-9

3. The aggregate base shall also conform to the following quality requirements:

	Test Method		
Tests	No. Calif.	Requirements	
Resistance (R-Value)*	301	78	Minimum
Sand Equivalent	217	30	Minimum
Durability Index	229	35	Minimum

4. The aggregate shall not be treated with lime, cement, or other chemicals before the Durability Index test is performed.
5. Material yielding a maximum dry density of less than 112 pounds per cubic foot when tested in the laboratory in accordance with ASTM "Standard Methods of Test of Moisture-Density Relations of Soils, Using 10-Pound Rammer and 18-Inch Drop", Designation D 1557, shall not be used.
6. Any rock, including red rock, meeting all the requirements of this Section will be acceptable. Such rock shall be plant processed at an approved processing plant.

2.2 EQUIPMENT

A. Furnish all necessary equipment required to accomplish the spreading, shaping, and compaction required.

PART 3 - EXECUTION

3.1 SUBGRADE

A. Proof roll subgrade immediately prior to commencement of spreading of aggregate base. Make necessary repairs as directed by the Geotechnical Engineer and as described in Section 321214 – Subgrade.

3.2 DELIVERY AND SPREADING

A. Aggregate base material shall be delivered to the roadbed as uniform mixtures; each layer shall be spread in one operation.

B. At the time aggregate base is spread it shall have a moisture content sufficient to obtain the required compaction. Such moisture shall be uniformly distributed throughout the material.

C. The material shall be spread upon the prepared subgrade by means of vehicles equipped with approved spreading devices at a uniform quantity per linear foot, which quantity will provide the required compacted thickness within the tolerances specified.

D. Depositing and spreading shall commence at that part of the work farthest from the supply of base material and shall progress continuously without breaks, unless otherwise directed by the Geotechnical Engineer.

E. Where the required thickness is six inches or less, the base material may be spread and compacted in one layer. Where the required thickness is more than six inches, the base material shall be spread and compacted in two or more layers of approximately equal thickness, and the maximum compacted thickness of any one layer shall not exceed six inches. Each layer shall be spread and compacted in a similar manner.

F. Base material placed in areas inaccessible to the spreading equipment may be spread in one or more layers by any means that will make possible the specified compaction and surface.

G. When the subgrade for aggregate base consists of cohesionless sand, and written permission is granted by the Geotechnical Engineer, the base material may be dumped in piles upon the subgrade and spread ahead from the dumped material.

H. The base material, after spreading, shall be shaped by means of a blade grader to such thickness that after watering and compacting, the completed base will conform to the required grade and cross section within the tolerances specified.

I. Segregation of aggregate shall be avoided; the base shall be free from pockets of coarse or fine material.

3.3 COMPACTION

A. Immediately following spreading, shaping, and smoothing, the full width of the base material shall be watered as ordered by the Geotechnical Engineer, and compacted by rolling with a minimum of two pieces of self-propelled reversible equipment. Compaction shall be as follows:

1. For initial rolling use a 3-wheel steel-tired roller, weighing not less than 12 tons distributed so that the rear wheels will apply to the surface being rolled not less than 325 pounds per linear inch of rear tire width. Rolling shall commence by covering completely the outer edge of the material. Subsequent passes shall lap at least 25 percent on previously rolled material.
2. For subsequent rolling use a pneumatic-tired roller of the oscillating type, having a width of not less than four feet and equipped with tires of equal size and diameter. Wobble wheel rollers will not be permitted. The tires shall be so spaced that the entire gap between

adjacent tires will be covered by the tread of the following tire. The tires shall be inflated to 90 pounds per square inch minimum.

3. To compact all areas inaccessible to the rollers, use compressed air or gas powered tampers.

B. Notify the Geotechnical Engineer at least ten (10) days in advance and shall secure approval for the use of each piece of compacting equipment other than that specified, selection thereof and obtainment of the specified compaction throughout the volume of base and the specified surface shall be solely the responsibility of the Contractor.

C. If compaction is not uniform or tests show it to be inadequate, or if the surface is unsatisfactory, the Geotechnical Engineer may require the use of other or additional equipment.

D. Should low or high spots develop during rolling operations, such spots shall be smoothed by blading with a self-propelled, pneumatic-tired motor grader having a wheelbase not less than 15 feet long and a blade not less than 10 feet long.

E. Aggregate base shall be watered after compaction. Water shall be applied at the rate and in the quantities ordered by the Geotechnical Engineer.

F. The relative compaction of aggregate base, determined by tests of the in-place, field compacted base shall be not less than 95 percent of the maximum compaction at optimum moisture content determined by ASTM Methods of Test, Designation D 1556 and Method C of Designation D 1557. The tests will be conducted and evaluated in the laboratory by the Geotechnical Engineer at no cost to the Contractor.

G. The surface of the finished aggregate base at any point shall not vary more than 0.05 foot above or below proper grade; such surface shall contain no ridges, valleys or sharp breaks.

H. Finished base that does not conform to the foregoing requirements shall be reshaped or reworked, watered, and thoroughly recompacted to conform thereto.

I. The Contractor shall not allow any completed untreated rock base to be subject to public or construction traffic, except the latter necessary to the completion of the overlying surface courses.

END OF SECTION

SECTION 321216 - ASPHALT CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This section covers the work necessary for construction of the asphalt concrete leveling course and surface course used for paving parking areas, and the repair and replacement of existing pavement that has been disturbed by trenching or other construction.
B. Related Sections:
   1. Section 312020 Site Grading.

1.2 SUBMITTALS

A. Submittals during construction shall be made in accordance with Division 1, General Requirements.
B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Certificates, signed by the materials producer and the asphalt paving subcontractor, stating that materials meet or exceed the specified requirements.

1.3 QUALITY ASSURANCE

A. Standards: The following shall form a part of this specification and shall have the same force as if reproduced in total herein:
   1. Standard Specifications.
   2. Materials Manual of Testing and Control Procedures, State of California, Business and Transportation Agency, Department of Transportation, herein after referred to as "Materials Manual".
   3. ASTM D 1577 shall be used for the method of performing compaction tests.

PART 2 - PRODUCTS

2.1 ASPHALT

A. Asphalt concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant.
   1. Reclaimed/recycled asphalt pavement shall not be used.
   2. Asphalt concrete shall be as required by jurisdiction.
   3. Grade of asphalt shall be AR-4000.
   4. Density shall be 95% of maximum laboratory density as determined

by California Test Method 304.

5. Stability shall be 30 minimum.
6. Mineral aggregate shall be Type B, ½" maximum size aggregate, medium grading, and shall conform to the following requirements:
   a. The particle size distribution shall be in accordance with the grading specified for 1/2-inch maximum size aggregate.

Sieve Size	Maximum Percentage Passing
3/4-Inch	100
1/2-Inch	95-100
3/8-Inch	80-85
No. 4	54-64
No. 8	38-48
No. 30	20-30
No. 200	3- 8

7. Drying, proportioning and mixing of the materials shall conform to Section 39 of the Standard Specifications.

B. Slurry Seal Coat shall be a Type II slurry seal and shall be a one coat process, or approved equivalent. The manufacturer shall supply the product in sealed containers, or provide certification of manufacturer to the Engineer.

C. Seal Coat shall be equal to SS1H one coat process, or equal. The manufacturer shall supply the product in sealed containers, or provide certification of manufacturer to the Engineer.

2.2 AGGREGATE

A. Aggregate base shall conform to the provisions of Section 0321215 Aggregate Base and as provided herein.
   1. The grading of the aggregate shall be "1/2 - inch Maximum, Medium" as described hereon, except in conform or overlay areas, the grading shall be 3/8 - inch maximum.

B. Sampling and testing will not be required. The Contractor shall provide test results as indicated in this section.

2.3 COMPOSITION OF MIXTURE

A. Submit a job - mix formula which meets the requirements herein specified.

B. Tests confirming the suitability of the material for the purpose intended shall be obtained by the Contractor at the Contractor's expense. Certified copies of the aggregate test results from an independent testing laboratory shall be furnished for review.

C. The Contractor shall make arrangement and pay for preparation of the asphalt concrete job mix formula. The job - mix formula for the asphalt concrete mixture shall establish the percentage of aggregate passing each sieve size, and the percentage of bituminous material to be added to said aggregate, and the temperature at which test results from a qualified, independent testing laboratory confirming the job - mix formula shall be

submitted for review. Test results of aggregate used in asphalt shall be provided as indicated in this section.

D. The job – mix formula shall indicate the gradation of each of the several aggregate constituents to be used in the mixture and shall establish the exact proportion of each constituent to be used to produce a combined gradation of aggregate within the appropriate limits stated above.

E. After a job - mix formula is established and reviewed, all mixtures furnished under this Contract shall be conform to the requirements and tolerances as stated in these Specifications.

2.4 WEED CONTROL

A. Spray applied herbicide, currently approved for designated use by all applicable agencies, including air pollution control jurisdiction.

PART 3 - EXECUTION

3.1 ASPHALT CONCRETE PAVEMENT

A. The proportioning and mixing of asphalt concrete shall conform to the provisions provided herein. The pounds of asphalt per 100 pounds of dry aggregates shall not vary by more than 5% above or 10% below the amount indicated in the job - mix formula. This requirement shall apply to samples taken from a single batch, successive batches, at different locations in the production plant, or at any location on the construction site.
B. Paint binder shall be applied in conformance with the provisions provided herein.
C. Spreading equipment and methods shall conform to the provisions provided herein.. No asphalt concrete shall be placed on any section of compacted aggregate base that has not been reviewed by the Geotechnical Engineer.
D. The asphalt concrete shall be compacted in accordance with the provisions provided herein. The weight and pressure of the Contractor's pneumatic tired roller will be reviewed, but not designated or approved, by the Geotechnical Engineer.
E. Confirm areas associated with placement of asphalt concrete conform to the provisions provided herein.

3.2 PLACEMENT OF ASPHALT CONCRETE PAVING

A. Install the specified curbs, and headers and stakes, to achieve the arrangement of paving shown on the drawings. All unconfined edges shall be confined with 2 inch by 4 inch redwood header boards staked with a 1 inch by 3 inch redwood stake 18 inches long minimum at 6 feet on-center. Two 1 inch by 4 inch pieces may installed together for bending along curves. Offset all joints by 2 feet.
B. Remove all loose materials from the compacted base.
C. Apply the specified prime coat, and tack coat where required, and allow to dry, in accordance with the manufacturer's recommendations as approved by the Engineer.
D. Asphalt paving shall be installed in minimum lifts of 1.5 inches.
E. Adjust frames, covers and utility vaults, if so required, to meet final grades.
F. Do not accept receipt of asphalt concrete material unless it is covered with a tarpaulin until unloaded, and unless the material has a temperature of not less than 280 degrees Fahrenheit.

3.3 CONNECTIONS WITH EXISTING FACILITIES

A. Where it is necessary to remove existing asphalt surfaces to provide proper meet lines and riding surfaces, burn or chip the existing surface so that there will be sufficient depth to provide a minimum of one inch of asphalt concrete. Prior to placing the asphalt concrete these areas shall be tacked. Meet lines

shall be straight and the edges vertical. The edges of meet lines cuts shall be painted with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, the meet line shall be sealed by painting with a liquid asphalt or emulsified asphalt and immediately covered with clean, dry sand.

B. Prior to laying the second strip of asphalt concrete pavement, the edge of the first strip laid and other contact surfaces such as curbs, manhole frames, and similar materials shall be painted with emulsified asphalt or liquid asphalt to provide closely bonded watertight joints. This work shall be done in a manner that will prevent staining adjacent surfaces not intended to be coated.

3.4 COMPACTION

A. Rolling shall continue until all roller marks are eliminated and a minimum density of 140 pcf has been obtained.

B. Field density tests shall be made by a commercial testing laboratory retained by the Owner, and the test results submitted to the Geotechnical Engineer for review.

3.5 JOINTS

A. The placing of the top or wearing course shall be as nearly continuous as possible, and the roller shall pass over the unprotected end of the freshly laid mixture only when the laying of the course is discontinued for such length of time as to permit the mixture to become chilled.

B. When the work is resumed the previously compacted mixture shall be cut back to produce a slightly beveled edge of the full thickness of the course. The material which is cut away shall be wasted and new mix shall be laid against the fresh cut. Rollers or tamping irons shall be used to seal the joints.

3.6 SURFACE TOLERANCE

A. Tests for Conformity with the specified crown and grade shall be made by the Contractor immediately after initial compression. Any variation shall be immediately corrected by the removal or addition of materials and by continuous rolling.

B. The completed surface of the top of wearing course shall be of uniform texture, smooth, uniform as to crown and grade and free from defects of all kinds. The completed surface shall not vary more than 1/8 inch from the lower edge of a 10 foot straight edge placed on the surface parallel to the centerline.

C. After completion of the final rolling, the smoothness and grade of the surface shall again be tested by the Contractor.

D. When deviations in excess of the above tolerances are found, the pavement

surface shall be corrected by the addition of asphalt concrete mixture of an appropriate class to low places or the removal of material from high places by methods satisfactory to the Engineer, or by removal and replacement of the wearing course of asphalt concrete. Correction of defects shall be carried out until there are not deviations anywhere greater than the allowable tolerances.

E. All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the Engineer.

F. All costs involved in making the corrections of defects described above shall be borne by the Contractor and no compensation will be made for this work.

3.7 APPLICATION OF SEAL OR SLURRY COAT

A. Areas that have received new AC shall have a minimum 30 day cure time prior to application of either seal or slurry coat.
Prepare the surfaces, mix the seal coat material, and apply in accordance with the manufacturer's recommendations as approved by the Geotechnical Engineer.

B. Apply one coat of the specified sealer.

C. Achieve a finished surface seal which, when dry and thoroughly set, is smooth, tough, resilient, of uniform black color, and free from coarse textured areas, lap marks, ridges, and other surface irregularities.

3.8 UNFAVORABLE WEATHER

A. Asphalt for prime coat shall not be applied when the ground temperature is lower than 50 degrees F without written permission of the Geotechnical Engineer.

B. Asphalt concrete shall not be placed when the atmospheric temperature is less than 40 degrees F nor during heavy rainfall.

3.9 ALLOWABLE TOLERANCES

A. Surface Smoothness:
   1. The surface of the finished base course shall not vary more than 3/8 inch, plus or minus, in 10 feet.
   2. The surface of the finished asphalt concrete shall not vary more than ¼ inch, plus or minus, in 10 feet.

B. The compacted paving or base course thickness shall not vary more than ¼ inch, plus or minus, based on an average of five (5) measurements per 10,000 square feet, taken at randomly selected locations by testing laboratory.

C. Provide hot plant mixed asphalt concrete paving materials:
   1. Temperature leaving the plant shall be 290 degrees Fahrenheit minimum, 320 degrees Fahrenheit maximum.
   2. Temperature at time of placing shall be 280 degrees Fahrenheit

minimum.

3.10 SURFACE FINISH

A. Surface finish shall be uniform and consistent in color and texture throughout the extents of the project and shall be achieved, at a minimum, by applying a slurry coat.

END OF SECTION