## MIGUELITO E.S. PORTABLES

for LOMPOC UNIFIED SCHOOL DISTRICT

## PROJECT MANUAL

O7 DECEMBER 2023 · KBZ JOB NO. 21047 · TRACKING NO. 69229-111 DSA Application O3-1238O3, File 42-22 (Miguelito Elementary)

> Owner: LOMPOC UNIFIED SCHOOL DISTRICT 1301 North A St · Lompoc, CA 93436 · Phone (805) 742-3300



Architect: KRUGER BENSEN ZIEMER ARCHITECTS, INC. 30 W Arrellaga St · Santa Barbara, CA 93101 Phone (805) 963-1726 · www.kbzarch.com

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# STATE OF CALIFORNIA - DEPARTMENT OF GENERAL SERVICES DIVISION OF THE STATE ARCHITECT



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## PROJECT MANUAL for PORTABLE CLASSROOMS at MIGUELITO ELEMENTARY

#### OWNER: BOARD OF EDUCATION

Lompoc Unified School District 1301 N A St Lompoc, CA 93436 (805) 742-3300

#### ARCHITECT: KRUGER BENSEN ZIEMER ARCHITECTS, INC.

30 W Arrellaga St Santa Barbara, CA 93101 (805) 963-1726 www.kbzarch.com

## CIVIL ENGINEER: FLOWERS & ASSOCIATES, INC.

115 W Canon Perdido St Santa Barbara, CA 93101 (805) 966-2224

## ELECTRICAL ENGINEER: C. HOOD & ASSOCIATES, INC.

858 Front St Ventura, CA 93001 (805) 641-4012 THIS PAGE INTENTIONALLY LEFT BLANK

## SCHEDULE OF DRAWINGS

#### GENERAL

1. G-001 TITLE SHEET

## <u>CIVIL</u>

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(MOBILE MODULAR MANAGEMENT, DSA #A04106743, PC 04-119396)

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## **SECTION 01 0001 - GENERAL DSA REQUIREMENTS**

#### PART 1 - GENERAL

- 1.1 All work shall be compliant with California Building Code Title 24, for Parts 1-6 and 9.
- 1.2 California Building Code Title 24, Parts1-5 must be kept on site during construction.
- 1.3 If any conflicts or inconsistencies exist between the specifications and the drawings (including the general notes), more stringent requirements shall take precedence.
- 1.4 All DSA addenda must be signed by Architect and approved by DSA (Section 4-338, Part 1).
- 1.5 All substitutions affecting DSA-regulated items shall be considered as a Construction Change Document (CCD) or Addenda and shall be approved by DSA prior to fabrication and installation. (IR A-6 and Section 4-338(c), Part 1).
  - A. DSA-regulated items are those which affect structural, life-safety, and/or accessibility components.
  - B. Construction Change Documents must be signed by all the following:
    - 1. A/E of Record
    - 2. Structural Engineer (when applicable)
    - 3. Delegated professional engineer (when applicable)
    - 4. DSA
- 1.6 The Project Inspector and testing lab must be employed by the owner and approved by all of the following:
  - A. A/E of Record
  - B. Structural Engineer (when applicable)
  - C. DSA

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 0001

## SECTION 01 1000 - SUMMARY

PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Project information.
  - 2. Work covered by Contract Documents.
  - 3. Work under Owner's separate contracts.
  - 4. Owner's product purchase contracts.
  - 5. Contractor's use of site and premises.
  - 6. Coordination with occupants.
  - 7. Work restrictions.
  - 8. Specification and Drawing conventions.
- B. Related Requirements:
  - 1. Section 01 5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
  - 2. Section 01 7300 "Execution" for coordination of Owner-installed products.

## 1.3 DEFINITIONS

A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

#### 1.4 PROJECT INFORMATION

- A. Project Identification: LUSD Miguelito ES Portables
  - 1. Project Location: 1600 W Olive Ave, Lompoc, CA 93436.
- B. Owner: Lompoc Unified School District, 1301 North A St, Lompoc, CA 93436.
  - 1. Owner's Representative: Sam Blanton, Director of Maintenance & Operations

- C. Architect: Kruger Bensen Ziemer Architects Inc.
  - 1. Architect's Representative: Todd Jespersen
- D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:
  - 1. Civil Engineering: Flowers & Associates.
    - a. Robert Schmidt.
  - 2. Electrical Engineering: C. Hood & Associates.
    - a. Electrical Engineering Representative: Craig Hood.

## 1.5 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
  - 1. Demolition of two deteriorating modular classrooms, relocating one portable classroom onsite, site prep and utilities for two new 24x40 portable classrooms, site remediation at the demolished and relocated portable areas, and other Work indicated in the Contract Documents.
- B. Type of Contract:
  - 1. Project will be constructed under a single prime contract.

#### 1.6 WORK UNDER OWNER'S SEPARATE CONTRACTS

- A. Work with Separate Contractors: Cooperate fully with Owner's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under Owner's separate contracts.
- B. Concurrent Work: Owner has awarded separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.
  - 1. Two 24x40 Portable Classrooms: To Mobile Modular for installation of two 24x40 portable classrooms including wood foundations, but excluding utilities, connections to said utilities, and ramps.

## 1.7 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Driveways, Walkways and Entrances: Keep driveways, loading areas, 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 for storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

#### 1.8 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy Project site and adjacent building(s) 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 approval of authorities having jurisdiction.
  - 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited 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 prior to Owner acceptance of the completed Work.
  - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
  - Before limited 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 Work.

- 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.
- 1.9 WORK RESTRICTIONS
  - A. Comply with restrictions on construction operations.
    - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
  - B. On-Site Work Hours: Limit work to between 7:00 a.m. to 7:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
    - 1. Weekend Hours: subject to prior approval, 72 hours min. notice.
    - 2. Early Morning Hours: not allowed.
    - 3. Work in Existing Building: subject to prior approval, 72 hours min. notice.
    - 4. Hours for Utility Shutdowns: subject to prior approval, 72 hours min. notice.
    - 5. Hours for Core Drilling and other noisy activities: subject to prior approval, 72 hours min. notice.
  - C. 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 for temporary utility services according to requirements indicated:
    - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
    - 2. Obtain Owner's written permission before proceeding with utility interruptions.
  - D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
    - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
    - 2. Obtain Owner's written permission before proceeding with disruptive operations.
  - E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, vaping, e-cigarettes, and other controlled substances on Owner's property is not permitted.
  - F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
  - G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
    - 1. Maintain list of approved screened personnel with Owner's representative.

## 1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. 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. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
  - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
  - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 1000

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## SECTION 01 2500 - SUBSTITUTION PROCEDURES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Section 01 6000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

#### 1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

### 1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying 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 acceptable to Architect.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
    - b. Coordination of information, including a list of changes or revisions 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 substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific

features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- e. Samples, where applicable or requested.
- f. Certificates and qualification data, where applicable or requested.
- g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
- h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
- i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
- j. Detailed comparison of Contractor's construction schedule using proposed substitutions 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 date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
- I. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
- m. 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.
- Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
  - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

#### 1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

## 1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

## 1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
  - 1. 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:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. 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.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.
  - 1. 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:
    - a. 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.
    - b. Requested substitution does not require extensive revisions to the Contract Documents.
    - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - d. Substitution request is fully documented and properly submitted.
    - e. Requested substitution will not adversely affect Contractor's construction schedule.

- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2500

## SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 01 2500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
  - 2. Section 01 3100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

#### 1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

## 1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will 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. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 10 days, when not otherwise specified, 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.
    - e. Quotation Form: Use forms acceptable to Architect.

- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim 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 Section 01 2500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
  - 7. Proposal Request Form: Use form acceptable to Architect.

## 1.4 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 or District form.

## 1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. 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 01 2600

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## SECTION 01 2900 - PAYMENT PROCEDURES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Section 01 2600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 2. Section 01 3200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

#### 1.2 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.

#### 1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use 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. Owner's name.
    - c. Owner's Project number.
    - d. Name of Architect.
    - e. Architect's Project number.
    - f. Contractor's name and address.
    - g. Date of submittal.

- 2. Arrange schedule of values consistent with format of AIA Document G703.
- 3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
  - a. Related Specification Section or division.
  - b. Description of the Work.
  - c. Name of subcontractor.
  - d. Name of manufacturer or fabricator.
  - e. Name of supplier.
  - f. Change Orders (numbers) that affect value.
  - g. Dollar value of the following, as a percentage of the Contract Sum to nearest onehundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
    - 1) Labor.
    - 2) Materials.
    - 3) Equipment.
- 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
- 5. 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.
- 6. Overhead Costs, Separate Line Items: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
- 7. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
- 8. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
- 9. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

### 1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

- C. Payment Application Times: Submit Application for Payment to Architect by the last day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
  - 1. Submit draft copy of Application for Payment seven days prior to due date for review by DSA Project Inspector and then the Architect.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
  - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
  - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  - 3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- G. Transmittal: Submit electronic signed and original PDF of each Application for Payment to DSA Project Inspector and Construction Manager via email. PDF shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit conditional final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of values.
  - 3. Contractor's construction schedule (preliminary if not final).
  - 4. Products list (preliminary if not final).
  - 5. Submittal schedule (preliminary if not final).
  - 6. List of Contractor's staff assignments.
  - 7. List of Contractor's principal consultants.
  - 8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 9. Initial progress report.
  - 10. Report of preconstruction conference.
- J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
  - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
    - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 01 7700 "Closeout Procedures."
  - 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  - 1. Evidence of completion of Project closeout requirements.
  - 2. Certification of completion of final punch list items.

- 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
- 4. Updated final statement, accounting for final changes to the Contract Sum.
- 5. AIA Document G706.
- 6. Evidence that claims have been settled.
- 7. Final liquidated damages settlement statement.
- 8. Proof that taxes, fees, and similar obligations are paid.
- 9. Waivers and releases.
- 10. Close-out documents, including as-built drawings and specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2900

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## SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. RFIs.
  - 4. Digital project management procedures.
  - 5. Project meetings.
- B. Related Requirements:
  - 1. Section 01 3200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 01 7300 "Execution" for procedures for coordinating general installation and fieldengineering services, including establishment of benchmarks and control points.
  - 3. Section 01 7700 "Closeout Procedures" for coordinating closeout of the Contract.

#### 1.2 DEFINITIONS

A. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.3 INFORMATIONAL SUBMITTALS

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

## 1.4 GENERAL COORDINATION PROCEDURES

- 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 to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include 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 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.

## 1.5 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
  - 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
- 1. Project name.
- 2. Owner name.
- 3. Owner's Project number.
- 4. Name of Architect.
- 5. Architect's Project number.
- 6. Date.
- 7. Name of Contractor.
- 8. RFI number, numbered sequentially.
- 9. RFI subject.
- 10. Specification Section number and title and related paragraphs, as appropriate.
- 11. Drawing number and detail references, as appropriate.
- 12. Field dimensions and conditions, as appropriate.
- **13. Contractor's suggested resolution.** If anticipated resolution or Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
- 14. Contractor's signature.
- 15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
  - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or software-generated form with substantially the same content as indicated above, acceptable to Architect.
  - 1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
  - 1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  - 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architectof additional information.
  - 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 2600 "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 5 days of receipt of the RFI response.
- E. 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 returned without action or withdrawn.
  - 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.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three days if Contractor disagrees with response.

# 1.6 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Architect's Data Files Not Available: Architect will not provide Architect's CAD drawing digital data files for Contractor's use during construction.
- B. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
  - 1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  - 2. Name file with submittal number or other unique identifier, including revision identifier.
  - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

## 1.7 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 a minimum of seven days prior to meeting.
  - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

- 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Architect will schedule and conduct 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.
  - 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. 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. Responsibilities and personnel assignments.
    - b. Tentative construction schedule.
    - c. Critical work sequencing and long lead items.
    - d. Designation of key personnel and their duties.
    - e. Lines of communications.
    - f. Procedures for processing field decisions and Change Orders.
    - g. Procedures for RFIs.
    - h. Procedures for testing and inspecting, including notification requirements for DSA Project Inspector and Testing Lab.
    - i. Procedures for processing Applications for Payment.
    - j. Distribution of the Contract Documents.
    - k. Submittal procedures.
    - I. Preparation of Record Documents.
    - m. Use of the premises.
    - n. Work restrictions.
    - o. Working hours.
    - p. Owner's occupancy requirements.
    - q. Responsibility for temporary facilities and controls.
    - r. Procedures for moisture and mold control.
    - s. Procedures for disruptions and shutdowns.
    - t. Construction waste management and recycling.
    - u. Parking availability.
    - v. Office, work, and storage areas.
    - w. Equipment deliveries and priorities.
    - x. First aid.
    - y. Security.
    - z. Progress cleaning.
  - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

- C. Project Closeout Conference ("Punch List Walk"): Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 7 days prior to the scheduled date of Substantial Completion.
  - 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  - 2. Attendees: Authorized representatives of Owner, Architect, DSA Project Inspector, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of Record Documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Procedures for completing and archiving web-based Project software site data files.
    - d. Submittal of written warranties.
    - e. Requirements for completing sustainable design documentation.
    - f. Requirements for preparing operations and maintenance data.
    - g. Requirements for delivery of material samples, attic stock, and spare parts.
    - h. Requirements for demonstration and training.
    - i. Preparation of Contractor's punch list.
    - j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - k. Submittal procedures.
    - I. Coordination of separate contracts.
    - m. Owner's partial occupancy requirements.
    - n. Installation of Owner's furniture, fixtures, and equipment.
    - o. Responsibility for removing temporary facilities and controls.
  - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.
  - 1. Coordinate dates of meetings with preparation of payment requests.
  - 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. 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 use.
  - 8) Temporary facilities and controls.
  - 9) Progress cleaning.
  - 10) Quality and work standards.
  - 11) Status of correction of deficient items.
  - 12) Field observations.
  - 13) Status of RFIs.
  - 14) Status of Proposal Requests.
  - 15) Pending changes.
  - 16) Status of Change Orders.
  - 17) Pending claims and disputes.
  - 18) Documentation of information for payment requests.
- 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
  - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

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# SECTION 01 3200 - CONSTRUCTION PROGRESS DOCUMENTATION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Startup construction schedule.
  - 2. Contractor's Construction Schedule.
  - 3. Construction schedule updating reports.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Site condition reports.
  - 7. Unusual event reports.
- B. Related Requirements:
  - 1. Section 01 4000 "Quality Requirements" for schedule of tests and inspections.
  - 2. Section 01 2900 "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.

## 1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine the critical path of Project and when activities can be performed.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.

- 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
- 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
- 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

# 1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  1. PDF file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Construction Schedule 3-Week Look-Ahead: Submit 24 hours minimum in advance of each construction progress meeting.
- E. Daily Construction Reports: Submit at weekly intervals.
- F. Material Location Reports: Submit at weekly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Unusual Event Reports: Submit at time of unusual event.

## 1.4 COORDINATION

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

# 1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
- B. Time Frame: Extend schedule from date established for the Notice of Award to date of Final Completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 10 days, unless specifically allowed by Architect.
  - 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
    - a. Temporary facilities.
    - b. Construction of mock-ups, prototypes and samples.
    - c. Owner interfaces and furnishing of items.
    - d. Interfaces with Separate Contracts.
    - e. Regulatory agency approvals.
    - f. Punch list.
  - 3. Procurement Activities: Include procurement process activities for the following long leadtime items and major items, requiring a cycle of more than 30 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
    - a. Prefabricated Ramp Assembly.
  - 4. Submittal Review Time: Include review and resubmittal times indicated in Section 01 3300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
  - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
  - 6. Punch List and Final Completion: Include not more than 14 days for completion of punch list items and Final Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - 1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  - 2. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.

- b. Limitations of continued occupancies.
- c. Uninterruptible services.
- d. Partial occupancy before Substantial Completion.
- e. Use-of-premises restrictions.
- f. Provisions for future construction.
- g. Seasonal variations.
- h. Environmental control.
- i. Permanent space enclosure.
- j. Completion of mechanical and plumbing installation.
- k. Completion of electrical installation.
- I. Substantial Completion.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  - 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and the Contract Time.
- F. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule with each pay application.
  - 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 every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate Final Completion percentage for each activity.
- G. Recovery Schedule: When periodic update indicates the Work is 7 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Distribution: Distribute copies of approved 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.

# 1.6 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 14 days of date established for the Notice to Proceed.
  - 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

## 1.7 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, including presence of rain or snow.
  - 7. Testing and inspection.
  - 8. Accidents.
  - 9. Meetings and significant decisions.
  - 10. Unusual events.
  - 11. Stoppages, delays, shortages, and losses.
  - 12. Meter readings and similar recordings.
  - 13. Emergency procedures.
  - 14. Orders and requests of authorities having jurisdiction.
  - 15. Change Orders received and implemented.
  - 16. Construction Change Directives received and implemented.
  - 17. Services connected and disconnected.
  - 18. Equipment or system tests and startups.
  - 19. Partial completions and occupancies.
  - 20. Substantial Completions authorized.
- B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

- 1. Material stored prior to previous report and remaining in storage.
- 2. Material stored prior to previous report and since removed from storage and installed.
- 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
  - 1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3200

# SECTION 01 3233 - PHOTOGRAPHIC DOCUMENTATION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Concealed Work photographs.
  - 3. Periodic construction photographs.
  - 4. Final Completion construction photographs.
- B. Related Requirements:
  - 1. Section 01 7700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
  - 2. Section 02 4119 "Selective Demolition" for photographic documentation before selective demolition operations commence.

#### 1.2 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
  - 1. Submit photos on USB thumb-drive or file transfer service such as Dropbox, ShareFile, etc. Include copy of key plan indicating each photograph's location and direction.
  - 2. Identification: Provide the following information with each image description:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date photograph was taken.
    - f. Description of location, vantage point, and direction.
    - g. Unique sequential identifier keyed to accompanying key plan.

## 1.3 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 10 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Metadata: Record accurate date and time and GPS location data from camera.
- D. File Names: Name media files with date, Project Name, and sequential numbering suffix.
  - 1. Example: 2021-05-13\_LaCanadalEEEP\_001.jpg

# 1.4 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
  - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
  - 1. Flag excavation areas before taking construction photographs.
  - 2. Take 20 photographs to show existing conditions adjacent to project site before starting the Work.
  - 3. Take 20 photographs of existing buildings and site improvements, to accurately record physical conditions at start of construction.
  - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- C. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
  - 1. Underground utilities.
  - 2. Underslab services.
  - 3. Piping.
  - 4. Electrical conduit.
  - 5. Waterproofing and weather-resistant barriers.
  - 6. Stacked wood foundation prior to installation of modular building.
- D. Periodic Construction Photographs: Take 20 photographs weekly. Select vantage points to show status of construction and progress since last photographs were taken.

- E. Final Completion Construction Photographs: Take 20 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.
- F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
  - 1. Three days' notice will be given, where feasible.
  - 2. In emergency situations, take additional photographs within 24 hours of request.
  - 3. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.
    - b. Immediate follow-up when on-site events result in construction damage or losses.
    - c. Photographs shall be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    - d. Substantial Completion of a major phase or component of the Work.
    - e. Extra record photographs at time of final acceptance.
    - f. Owner's request for special publicity photographs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3233

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# SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Submittal schedule requirements.
  - 2. Administrative and procedural requirements for submittals.
- B. Related Requirements:
  - 1. Section 01 2900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
  - 2. Section 01 3100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
  - 3. Section 01 3200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
  - 4. Section 01 3233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
  - 5. Section 01 4000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
  - 6. Section 01 7700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
  - 7. Section 01 7823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 8. Section 01 7839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

## 1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  - 2. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
  - 3. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal Category: Action; informational.
    - d. Name of subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for Architect's final release or approval.

# 1.4 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
  - 1. Project name.
  - 2. Date.
  - 3. Name of Architect.
  - 4. Name of Contractor.
  - 5. Name of firm or entity that prepared submittal.
  - 6. Names of subcontractor, manufacturer, and supplier.
  - 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
  - 8. Category and type of submittal.
  - 9. Submittal purpose and description.
  - 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
  - 11. Drawing number and detail references, as appropriate.
  - 12. Indication of full or partial submittal.
  - 13. Location(s) where product is to be installed, as appropriate.
  - 14. Other necessary identification.
  - 15. Remarks.
  - 16. Signature of transmitter.

- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Paper Submittals: Not required
- E. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
  - 1. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using AIA Document G810 or Contractor's standard transmittal form acceptable to Architect.
    - a. Transmittal shall be the first page of the PDF submittal.
    - b. Provide a blank space approximately 4 by 4 inches on the transmittal sheet for Architect's and consultant's (where applicable) review and approval markings and action(s) taken.

#### 1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Email: Prepare submittals as PDF package and transmit to Architect by sending via email. Include PDF transmittal form as part of each submittal. Include information in email subject line as requested by Architect.
    - a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
    - b. Architect will return final approved submittal file to DSA Inspector for field verification.
- B. 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. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow 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. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 7 days for review of each resubmittal.
  - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 10 days for initial review of each submittal.
- D. 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 with approval notation from Architect's action stamp.
- E. 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.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## 1.6 SUBMITTAL REQUIREMENTS

- A. 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 published data are unsuitable 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.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.

- f. Application of testing agency labels and seals.
- g. Notation of coordination requirements.
- h. Availability and delivery time information.
- 4. For equipment, include the following in addition to the above, as applicable:
  - a. Wiring diagrams that show factory-installed wiring.
  - b. Printed performance curves.
  - c. Operational range diagrams.
  - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
- B. 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 unless submittal based on Architect's digital data drawing files is otherwise permitted.
  - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
  - 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
  - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number.
    - b. Generic description of Sample.
    - c. Product name and name of manufacturer.
    - d. Sample source.
    - e. Number and title of applicable Specification Section.
    - f. Specification paragraph number and generic name of each item.
  - 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.
  - 4. Paper Transmittal: Include paper transmittal, including complete submittal information indicated.

- 5. 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.
- 6. 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 one full set(s) 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.
- 7. 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.
    - 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.
- D. Product Schedule: 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 indicated in the Contract Documents or assigned by Contractor if none is indicated.
  - 2. Manufacturer and product name, and model number if applicable.
  - 3. Number and name of room or space.
  - 4. Location within room or space.

- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
  - 1. Certificates and Certifications Submittals: Submit a 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. Provide a notarized signature where indicated.
  - 2. Installer Certificates: Submit 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.
  - 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
  - 4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
  - 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
  - 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
  - 1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
  - 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
  - 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
  - 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
  - 5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on

evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- 6. Research Reports: Submit 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:
  - a. Name of evaluation organization.
  - b. Date of evaluation.
  - c. Time period when report is in effect.
  - d. Product and manufacturers' names.
  - e. Description of product.
  - f. Test procedures and results.
  - g. Limitations of use.

## 1.7 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include 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.
  - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

## 1.8 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.
  - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
- B. 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.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3300

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# SECTION 01 3516 - ALTERATION PROJECT PROCEDURES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section includes special procedures for alteration work.

#### 1.2 DEFINITIONS

- A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- B. Consolidate: To strengthen loose or deteriorated materials in place.
- C. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- D. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- E. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- F. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- G. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- H. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- I. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- J. Retain: To keep an element or detail secure and intact.
- K. Strip: To remove existing finish down to base material unless otherwise indicated.

# 1.3 INFORMATIONAL SUBMITTALS

- A. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.
- B. Fire-Prevention Plan: Submit 30 days before work begins.

## 1.4 QUALITY ASSURANCE

- A. Specialist Qualifications (relocation of existing portable classroom): An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.
  - 1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
- B. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.
- C. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.
  - 1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
  - 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- D. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.
- E. Safety and Health Standard: Comply with ANSI/ASSP A10.6.

## 1.5 STORAGE AND HANDLING OF SALVAGED MATERIALS

- A. Salvaged Materials:
  - 1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
  - 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area off-site at District Maintenance & Operations.
  - 5. Protect items from damage during transport and storage.
- B. Salvaged Materials for Reinstallation:
  - 1. Repair and clean items for reuse as indicated.
  - 2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label 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 unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.
- C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.
- D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.
  - 1. Identify each item for reinstallation with a non-permanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
  - 2. Secure stored materials to protect from theft.
  - 3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F or more above the dew point.
- E. Storage Space:
  - 1. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

## 1.6 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of preconstruction photographs and preconstruction videotapes.

- 1. Comply with requirements specified in Section 01 3233 "Photographic Documentation."
- B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- C. Owner's Removals: Before beginning alteration work, verify in correspondence with Owner that the following items have been removed:
  - 1. Loose furniture.
- D. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

#### PART 2 - PRODUCTS - (Not Used)

#### PART 3 - EXECUTION

# 3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
  - 1. Use only proven protection methods, appropriate to each area and surface being protected.
  - 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
  - 3. Erect temporary barriers to form and maintain fire-egress routes.
  - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
  - 5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
  - 6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
  - 7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
- B. Temporary Protection of Materials to Remain:
  - 1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
  - 2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
- D. Utility and Communications Services:
  - 1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
  - 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
  - 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.
- E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.
  - 1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
  - 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

## 3.2 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:
  - 1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled "Owner's Responsibility for Fire Protection."
  - 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.
    - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:
  - 1. Obtain Owner's approval for operations involving use of open-flame or welding or other high-heat equipment. Notify Owner at least 72 hours before each occurrence, indicating location of such work.

- 2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
- 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
- 4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
- 5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
- 6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:
  - a. Train each fire watch in the proper operation of fire-control equipment and alarms.
  - b. Prohibit fire-watch personnel from other work that would be a distraction from firewatch duties.
  - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
  - d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
  - e. Maintain fire-watch personnel at Project site until 60 minutes after conclusion of daily work.
- C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

# 3.3 PROTECTION DURING APPLICATION OF CHEMICALS

- A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.
- B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.
- C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
- D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

## 3.4 GENERAL ALTERATION WORK

- A. Have specialty work performed only by qualified specialists.
- B. Ensure that supervisory personnel are present when work begins and during its progress.
- C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs or video recordings. Comply with requirements in Section 01 3233 "Photographic Documentation."
- D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
- E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
  - 1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 01 3516

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# SECTION 01 4000 - QUALITY REQUIREMENTS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection 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 work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other qualityassurance 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.
  - 4. Also refer to DSA-approved form DSA-103 for project Testing and Inspection requirements.

## 1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. 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, assembly, and similar operations.
  - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified

criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

- E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- H. 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.
- I. 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. Contractor's quality-control services do not include contract administration activities performed by Architect.

## 1.3 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is 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.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
  - 2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Testing Agency Qualifications: 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.
- E. Schedule of Tests and Inspections: See DSA-approved form DSA-103.

# 1.5 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, telephone number, and email address 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 inspection.
  - 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.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, telephone number, and email address of technical 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 of whether conditions, products, and installation will affect warranty.
- 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, telephone number, and email address of factory-authorized service representative making report.
  - 2. Statement that equipment complies with requirements.
  - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 4. Statement of whether conditions, products, and installation will affect warranty.
  - 5. Other required items indicated in individual Specification Sections.

# 1.6 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. 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.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
  - 1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- F. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

# 1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
  - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
  - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  - 2. Engage a qualified testing agency to perform quality-control services.
    - a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  - 3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspection will be performed; notification shall happen via the DSA project inspector.
  - 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  - 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. 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.

- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
  - 3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
  - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar qualitycontrol service through Contractor.
  - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  - 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives 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 inspection. Assist agency in obtaining samples.
  - 4. Facilities for storage and field curing of test samples.
  - 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  - 6. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

# 1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency and special inspector (if required) to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures, and reviewing the completeness and adequacy of those procedures to perform the Work.
  - 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
  - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  - 5. Interpreting tests and inspections, and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
  - 6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (Not Used)

- PART 3 EXECUTION
- 3.1 TEST AND INSPECTION LOG
  - A. Test and Inspection Log: 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 revisions as they occur. Provide access to test and inspection log for Architect's and authorities' having jurisdiction reference during normal working hours.
    - 1. Submit log at Project closeout as part of Project Record Documents.

## 3.2 REPAIR AND PROTECTION

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

Comply with the Contract Document requirements for cutting and patching in Section 01 7300 "Execution."

- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

# **SECTION 01 4200 - REFERENCES**

#### PART 1 - GENERAL

## 1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "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.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "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."
- E. "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.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "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.

#### 1.2 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.

- 1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.
- 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.

# 1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Abbreviations and acronyms not included in this list shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. AABC Associated Air Balance Council; <u>www.aabc.com</u>.
  - 2. AAMA American Architectural Manufacturers Association; (See FGIA).
  - 3. AAPFCO Association of American Plant Food Control Officials; <u>www.aapfco.org</u>.
  - 4. AASHTO American Association of State Highway and Transportation Officials; <u>www.transportation.org</u>.
  - 5. AATCC American Association of Textile Chemists and Colorists; <u>www.aatcc.org</u>.
  - 6. ABMA American Bearing Manufacturers Association; <u>www.americanbearings.org</u>.
  - 7. ABMA American Boiler Manufacturers Association; <u>www.abma.com</u>.
  - 8. ACI American Concrete Institute; (Formerly: ACI International); <u>www.concrete.org</u>.
  - 9. ACPA American Concrete Pipe Association; <u>www.concrete-pipe.org</u>.
  - 10. AEIC Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
  - 11. AF&PA American Forest & Paper Association; <u>www.afandpa.org</u>.
  - 12. AGA American Gas Association; <u>www.aga.org</u>.
  - 13. AHAM Association of Home Appliance Manufacturers; www.aham.org.
  - 14. AHRI Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
  - 15. AI Asphalt Institute; www.asphaltinstitute.org.
  - 16. AIA American Institute of Architects (The); www.aia.org.
  - 17. AISC American Institute of Steel Construction; www.aisc.org.
  - 18. AISI American Iron and Steel Institute; www.steel.org.
  - 19. AITC American Institute of Timber Construction; <u>www.plib.org</u>.
  - 20. AMCA Air Movement and Control Association International, Inc.; <u>www.amca.org</u>.

- 21. ANSI American National Standards Institute; <u>www.ansi.org</u>.
- 22. AOSA Association of Official Seed Analysts, Inc.; <u>www.aosaseed.com</u>.
- 23. APA APA The Engineered Wood Association; <u>www.apawood.org</u>.
- 24. APA Architectural Precast Association; <u>www.archprecast.org</u>.
- 25. API American Petroleum Institute; <u>www.api.org</u>.
- 26. ARI Air-Conditioning & Refrigeration Institute; (See AHRI).
- 27. ARI American Refrigeration Institute; (See AHRI).
- 28. ARMA Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
- 29. ASCE American Society of Civil Engineers; <u>www.asce.org</u>.
- 30. ASCE/SEI American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
- 31. ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers; <u>www.ashrae.org</u>.
- 32. ASME ASME International; (American Society of Mechanical Engineers); www.asme.org.
- 33. ASSE American Society of Sanitary Engineering; <u>www.asse-plumbing.org</u>.
- 34. ASSP American Society of Safety Professionals (The); www.assp.org.
- 35. ASTM ASTM International; <u>www.astm.org</u>.
- 36. ATIS Alliance for Telecommunications Industry Solutions; www.atis.org.
- 37. AVIXA Audiovisual and Integrated Experience Association; (Formerly: Infocomm International); <u>www.avixa.org</u>.
- 38. AWEA American Wind Energy Association; <u>www.awea.org</u>.
- 39. AWI Architectural Woodwork Institute; <u>www.awinet.org</u>.
- 40. AWMAC Architectural Woodwork Manufacturers Association of Canada; <u>www.awmac.com</u>.
- 41. AWPA American Wood Protection Association; <u>www.awpa.com</u>.
- 42. AWS American Welding Society; <u>www.aws.org</u>.
- 43. AWWA American Water Works Association; www.awwa.org.
- 44. BHMA Builders Hardware Manufacturers Association; www.buildershardware.com.
- 45. BIA Brick Industry Association (The); <u>www.gobrick.com</u>.
- 46. BICSI BICSI, Inc.; www.bicsi.org.
- 47. BIFMA BIFMA International; (Business and Institutional Furniture Manufacturer's Association); <u>www.bifma.org</u>.
- 48. BISSC Baking Industry Sanitation Standards Committee; <u>www.bissc.org</u>.
- 49. BWF Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
- 50. CDA Copper Development Association; <u>www.copper.org</u>.
- 51. CE Conformite Europeenne; <u>www.ec.europa.eu/growth/single-market/ce-marking</u>.
- 52. CEA Canadian Electricity Association; <u>www.electricity.ca</u>.
- 53. CFFA Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
- 54. CFSEI Cold-Formed Steel Engineers Institute; <u>www.cfsei.org</u>.
- 55. CGA Compressed Gas Association; <u>www.cganet.com</u>.
- 56. CIMA Cellulose Insulation Manufacturers Association; www.cellulose.org.
- 57. CISCA Ceilings & Interior Systems Construction Association; www.cisca.org.
- 58. CISPI Cast Iron Soil Pipe Institute; <u>www.cispi.org</u>.
- 59. CLFMI Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
- 60. CPA Composite Panel Association; <u>www.compositepanel.org</u>.
- 61. CRI Carpet and Rug Institute (The); <u>www.carpet-rug.org</u>.

- 62. CRRC Cool Roof Rating Council; www.coolroofs.org.
- 63. CRSI Concrete Reinforcing Steel Institute; www.crsi.org.
- 64. CSA CSA Group; <u>www.csa-group.org</u>.
- 65. CSI Cast Stone Institute; <u>www.caststone.org</u>.
- 66. CSI Construction Specifications Institute (The); <u>www.csiresources.org</u>.
- 67. CSSB Cedar Shake & Shingle Bureau; www.cedarbureau.org.
- 68. CTA Consumer Technology Association; <u>www.cta.tech</u>.
- 69. CTI Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.coolingtechnology.org.
- 70. CWC Composite Wood Council; (See CPA).
- 71. DASMA Door and Access Systems Manufacturers Association; <u>www.dasma.com</u>.
- 72. DHA Decorative Hardwoods Association; (Formerly: Hardwood Plywood & Veneer Association); <u>www.decorativehardwoods.org</u>.
- 73. DHI Door and Hardware Institute; www.dhi.org.
- 74. ECA Electronic Components Association; (See ECIA).
- 75. ECAMA Electronic Components Assemblies & Materials Association; (See ECIA).
- 76. ECIA Electronic Components Industry Association; www.ecianow.org.
- 77. EIA Electronic Industries Alliance; (See TIA).
- 78. EIMA EIFS Industry Members Association; www.eima.com.
- 79. EJMA Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
- 80. EOS/ESD Association; (Electrostatic Discharge Association); www.esda.org.
- 81. ESTA Entertainment Services and Technology Association; (See PLASA).
- 82. ETL Intertek (See Intertek); <u>www.intertek.com</u>.
- 83. EVO Efficiency Valuation Organization; www.evo-world.org.
- 84. FCI Fluid Controls Institute; www.fluidcontrolsinstitute.org.
- 85. FGIA Fenestration and Glazing Industry Alliance; <u>https://fgiaonline.org</u>.
- 86. FIBA Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
- 87. FIVB Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
- 88. FM Approvals FM Approvals LLC; www.fmapprovals.com.
- 89. FM Global FM Global; (Formerly: FMG FM Global); www.fmglobal.com.
- 90. FRSA Florida Roofing, Sheet Metal Contractors Association, Inc.; www.floridaroof.com.
- 91. FSA Fluid Sealing Association; www.fluidsealing.com.
- 92. FSC Forest Stewardship Council U.S.; www.fscus.org.
- 93. GA Gypsum Association; <u>www.gypsum.org</u>.
- 94. GANA Glass Association of North America; (See NGA).
- 95. GS Green Seal; <u>www.greenseal.org</u>.
- 96. HI Hydraulic Institute; www.pumps.org.
- 97. HI/GAMA Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
- 98. HMMA Hollow Metal Manufacturers Association; (See NAAMM).
- 99. HPVA Hardwood Plywood & Veneer Association; (See DHA).
- 100. IAPSC International Association of Professional Security Consultants; www.iapsc.org.
- 101. IAS International Accreditation Service; www.iasonline.org.
- 102. ICBO International Conference of Building Officials; (See ICC).
- 103. ICC International Code Council; www.iccsafe.org.
- 104. ICEA Insulated Cable Engineers Association, Inc.; <u>www.icea.net</u>.

- 105. ICPA International Cast Polymer Association; <u>www.theicpa.com</u>.
- 106. ICRI International Concrete Repair Institute, Inc.; www.icri.org.
- 107. IEC International Electrotechnical Commission; <u>www.iec.ch</u>.
- 108. IEEE Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
- 109. IES Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); <u>www.ies.org</u>.
- 110. IESNA Illuminating Engineering Society of North America; (See IES).
- 111. IEST Institute of Environmental Sciences and Technology; www.iest.org.
- 112. IGMA Insulating Glass Manufacturers Alliance; (See FGIA).
- 113. IGSHPA International Ground Source Heat Pump Association; www.igshpa.org.
- 114. II Infocomm International; (See AVIXA).
- 115. ILI Indiana Limestone Institute of America, Inc.; <u>www.iliai.com</u>.
- 116. Intertek Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); <u>www.intertek.com</u>.
- 117. ISA International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); <u>www.isa.org</u>.
- 118. ISAS Instrumentation, Systems, and Automation Society (The); (See ISA).
- 119. ISFA International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); <u>www.isfanow.org</u>.
- 120. ISO International Organization for Standardization; <u>www.iso.org</u>.
- 121. ISSFA International Solid Surface Fabricators Association; (See ISFA).
- 122. ITU International Telecommunication Union; <u>www.itu.int</u>.
- 123. KCMA Kitchen Cabinet Manufacturers Association; <u>www.kcma.org</u>.
- 124. LMA Laminating Materials Association; (See CPA).
- 125. LPI Lightning Protection Institute; <u>www.lightning.org</u>.
- 126. MBMA Metal Building Manufacturers Association; <u>www.mbma.com</u>.
- 127. MCA Metal Construction Association; www.metalconstruction.org.
- 128. MFMA Maple Flooring Manufacturers Association, Inc.; <u>www.maplefloor.org</u>.
- 129. MFMA Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
- 130. MHI Material Handling Industry; <u>www.mhi.org</u>.
- 131. MIA Marble Institute of America; (See NSI).
- 132. MMPA Moulding & Millwork Producers Association; <u>www.wmmpa.com</u>.
- 133. MPI Master Painters Institute; <u>www.paintinfo.com</u>.
- 134. MSS Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; <u>www.mss-hq.org</u>.
- 135. NAAMM National Association of Architectural Metal Manufacturers; <u>www.naamm.org</u>.
- 136. NACE NACE International; (National Association of Corrosion Engineers International); <u>www.nace.org</u>.
- 137. NADCA National Air Duct Cleaners Association; <u>www.nadca.com</u>.
- 138. NAIMA North American Insulation Manufacturers Association; www.naima.org.
- 139. NALP National Association of Landscape Professionals; <u>www.landscapeprofessionals.org</u>.
- 140. NBGQA National Building Granite Quarries Association, Inc.; <u>www.nbgqa.com</u>.
- 141. NBI New Buildings Institute; <u>www.newbuildings.org</u>.
- 142. NCAA National Collegiate Athletic Association (The); www.ncaa.org.
- 143. NCMA National Concrete Masonry Association; www.ncma.org.
- 144. NEBB National Environmental Balancing Bureau; www.nebb.org.

- 145. NECA National Electrical Contractors Association; <u>www.necanet.org</u>.
- 146. NeLMA Northeastern Lumber Manufacturers Association; <u>www.nelma.org</u>.
- 147. NEMA National Electrical Manufacturers Association; <u>www.nema.org</u>.
- 148. NETA InterNational Electrical Testing Association; www.netaworld.org.
- 149. NFHS National Federation of State High School Associations; <u>www.nfhs.org</u>.
- 150. NFPA National Fire Protection Association; <u>www.nfpa.org</u>.
- 151. NFPA NFPA International; (See NFPA).
- 152. NFRC National Fenestration Rating Council; <u>www.nfrc.org</u>.
- 153. NGA National Glass Association (The); (Formerly: Glass Association of North America); www.glass.org.
- 154. NHLA National Hardwood Lumber Association; <u>www.nhla.com</u>.
- 155. NLGA National Lumber Grades Authority; <u>www.nlga.org</u>.
- 156. NOFMA National Oak Flooring Manufacturers Association; (See NWFA).
- 157. NOMMA National Ornamental & Miscellaneous Metals Association; www.nomma.org.
- 158. NRCA National Roofing Contractors Association; www.nrca.net.
- 159. NRMCA National Ready Mixed Concrete Association; www.nrmca.org.
- 160. NSF NSF International; <u>www.nsf.org</u>.
- 161. NSI National Stone Institute; (Formerly: Marble Institute of America); www.naturalstoneinstitute.org.
- 162. NSPE National Society of Professional Engineers; <u>www.nspe.org</u>.
- 163. NSSGA National Stone, Sand & Gravel Association; <u>www.nssga.org</u>.
- 164. NTMA National Terrazzo & Mosaic Association, Inc. (The); <u>www.ntma.com</u>.
- 165. NWFA National Wood Flooring Association; www.nwfa.org.
- 166. NWRA National Waste & Recycling Association; <u>www.wasterecycling.org</u>
- 167. PCI Precast/Prestressed Concrete Institute; <u>www.pci.org</u>.
- 168. PDI Plumbing & Drainage Institute; <u>www.pdionline.org</u>.
- 169. PLASA PLASA; (Formerly: ESTA Entertainment Services and Technology Association); www.plasa.org.
- 170. RCSC Research Council on Structural Connections; <u>www.boltcouncil.org</u>.
- 171. RFCI Resilient Floor Covering Institute; <u>www.rfci.com</u>.
- 172. RIS Redwood Inspection Service; <u>www.redwoodinspection.com</u>.
- 173. SAE SAE International; <u>www.sae.org</u>.
- 174. SCTE Society of Cable Telecommunications Engineers; <u>www.scte.org</u>.
- 175. SDI Steel Deck Institute; www.sdi.org.
- 176. SDI Steel Door Institute; <u>www.steeldoor.org</u>.
- 177. SEFA Scientific Equipment and Furniture Association (The); <u>www.sefalabs.com</u>.
- 178. SEI/ASCE Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
- 179. SIA Security Industry Association; <u>www.siaonline.org</u>.
- 180. SJI Steel Joist Institute; <u>www.steeljoist.org</u>.
- 181. SMA Screen Manufacturers Association; <u>www.smainfo.org</u>.
- 182. SMACNA Sheet Metal and Air Conditioning Contractors' National Association; <u>www.smacna.org</u>.
- 183. SMPTE Society of Motion Picture and Television Engineers; <u>www.smpte.org</u>.
- 184. SPFA Spray Polyurethane Foam Alliance; <u>www.sprayfoam.org</u>.
- 185. SPIB Southern Pine Inspection Bureau; www.spib.org.
- 186. SPRI Single Ply Roofing Industry; <u>www.spri.org</u>.

- 187. SRCC Solar Rating & Certification Corporation; <u>www.solar-rating.org</u>.
- 188. SSINA Specialty Steel Industry of North America; <u>www.ssina.com</u>.
- 189. SSPC SSPC: The Society for Protective Coatings; <u>www.sspc.org</u>.
- 190. STI Steel Tank Institute; <u>www.steeltank.com</u>.
- 191. SWI Steel Window Institute; <u>www.steelwindows.com</u>.
- 192. SWPA Submersible Wastewater Pump Association; <u>www.swpa.org</u>.
- 193. TCA Tilt-Up Concrete Association; <u>www.tilt-up.org</u>.
- 194. TCNA Tile Council of North America, Inc.; <u>www.tileusa.com</u>.
- 195. TEMA Tubular Exchanger Manufacturers Association, Inc.; <u>www.tema.org</u>.
- 196. TIA Telecommunications Industry Association (The); (Formerly: TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
- 197. TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
- 198. TMS The Masonry Society; <u>www.masonrysociety.org</u>.
- 199. TPI Truss Plate Institute; <u>www.tpinst.org</u>.
- 200. TPI Turfgrass Producers International; www.turfgrasssod.org.
- 201. TRI Tile Roofing Institute; <u>www.tileroofing.org</u>.
- 202. UL Underwriters Laboratories Inc.; <u>www.ul.com</u>.
- 203. UL LLC UL LLC; www.ul.com.
- 204. UNI Uni-Bell PVC Pipe Association; www.uni-bell.org.
- 205. USAV USA Volleyball; www.usavolleyball.org.
- 206. USGBC U.S. Green Building Council; <u>www.usgbc.org</u>.
- 207. USITT United States Institute for Theatre Technology, Inc.; www.usitt.org.
- 208. WA Wallcoverings Association; <u>www.wallcoverings.org</u>.
- 209. WCLIB West Coast Lumber Inspection Bureau; www.wclib.org.
- 210. WCMA Window Covering Manufacturers Association; <u>www.wcmanet.org</u>.
- 211. WDMA Window & Door Manufacturers Association; <u>www.wdma.com</u>.
- 212. WI Woodwork Institute; <u>www.wicnet.org</u>.
- 213. WSRCA Western States Roofing Contractors Association; www.wsrca.com.
- 214. WWPA Western Wood Products Association; <u>www.wwpa.org</u>.
- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
  - 1. DIN Deutsches Institut fur Normung e.V.; <u>www.din.de</u>.
  - 2. IAPMO International Association of Plumbing and Mechanical Officials; <u>www.iapmo.org</u>.
  - 3. ICC International Code Council; <u>www.iccsafe.org</u>.
  - 4. ICC-ES ICC Evaluation Service, LLC; <u>www.icc-es.org</u>.
- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
  - 1. COE Army Corps of Engineers; <u>www.usace.army.mil</u>.
  - 2. CPSC Consumer Product Safety Commission; <u>www.cpsc.gov</u>.

- 3. DOC Department of Commerce; National Institute of Standards and Technology; <u>www.nist.gov</u>.
- 4. DOD Department of Defense; <u>www.quicksearch.dla.mil</u>.
- 5. DOE Department of Energy; <u>www.energy.gov</u>.
- 6. EPA Environmental Protection Agency; <u>www.epa.gov</u>.
- 7. FAA Federal Aviation Administration; www.faa.gov.
- 8. FG Federal Government Publications; <u>www.gpo.gov/fdsys</u>.
- 9. GSA General Services Administration; <u>www.gsa.gov</u>.
- 10. HUD Department of Housing and Urban Development; <u>www.hud.gov</u>.
- 11. LBL Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; <u>www.eetd.lbl.gov</u>.
- 12. OSHA Occupational Safety & Health Administration; <u>www.osha.gov</u>.
- 13. SD Department of State; <u>www.state.gov</u>.
- 14. TRB Transportation Research Board; National Cooperative Highway Research Program; The National Academies; <u>www.trb.org</u>.
- 15. USDA Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; <u>www.ars.usda.gov</u>.
- 16. USDA Department of Agriculture; Rural Utilities Service; <u>www.usda.gov</u>.
- 17. USDOJ Department of Justice; Office of Justice Programs; National Institute of Justice; <u>www.ojp.usdoj.gov</u>.
- 18. USP U.S. Pharmacopeial Convention; <u>www.usp.org</u>.
- 19. USPS United States Postal Service; <u>www.usps.com</u>.
- E. 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 in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. CFR Code of Federal Regulations; Available from Government Printing Office; <u>www.govinfo.gov</u>.
  - 2. DOD Department of Defense; Military Specifications and Standards; Available from DLA Document Services; <u>www.quicksearch.dla.mil</u>.
  - 3. DSCC Defense Supply Center Columbus; (See FS).
  - 4. FED-STD Federal Standard; (See FS).
  - 5. FS Federal Specification; Available from DLA Document Services; <u>www.quicksearch.dla.mil</u>.
    - a. Available from Defense Standardization Program; <u>www.dsp.dla.mil</u>.
    - b. Available from General Services Administration; <u>www.gsa.gov</u>.
    - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
  - 6. MILSPEC Military Specification and Standards; (See DOD).
  - 7. USAB United States Access Board; <u>www.access-board.gov</u>.
  - 8. USATBCB U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; <u>www.bearhfti.ca.gov</u>.
  - 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; <u>www.calregs.com</u>.
  - 3. CDHS; California Department of Health Services; (See CDPH).
  - 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Main-Page.aspx.
  - 5. CPUC; California Public Utilities Commission; <u>www.cpuc.ca.gov</u>.
  - 6. SCAQMD; South Coast Air Quality Management District; <u>www.aqmd.gov</u>.
  - 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 4200

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# SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 01 1000 "Summary" for work restrictions and limitations on utility interruptions.

#### 1.2 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project 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: Not applicable.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

## 1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

- B. Implementation and Termination Schedule: Within 10 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dustand HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.
  - 2. HVAC system isolation schematic drawing.
  - 3. Location of proposed air-filtration system discharge.
  - 4. Waste-handling procedures.
  - 5. Other dust-control measures.
- F. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by the Owner. Include the following:
  - 1. Methods used to meet the goals and requirements of the Owner.
  - 2. Concrete cutting method(s) to be used.
  - 3. Location of construction devices on the site.
  - 4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
  - 5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with the Owner.
  - 6. Indicate locations of sensitive areas or other areas requiring special attention as identified by Owner. Indicate means for complying with Owner's requirements.

## 1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines, CBC Chapter 11B, and ICC/ANSI A117.1.

## 1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to 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, 0.148-inch-thick, 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. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain-link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

# 2.2 TEMPORARY FACILITIES

- A. Field Offices: Not required.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. Store combustible materials apart from building.

#### 2.3 EQUIPMENT

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

## PART 3 - EXECUTION

- 3.1 TEMPORARY FACILITIES, GENERAL
  - A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

# 3.2 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.
  - 1. Locate facilities to limit site disturbance as specified in Section 01 1000 "Summary."
- 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.

## 3.3 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. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
  - 1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted.
- D. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- E. Lighting: Provide 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.
- F. Telephone Service: Not required.

## 3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

- 1. Provide construction for temporary shops and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
- 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. 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.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- D. Storage and Staging: Use designated areas of Project site for storage and staging needs.
- E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Optional Identification Signs: Provide Project identification signs as indicated on Drawings.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Maintain and touch up signs, so they are legible at all times.
- F. Waste Disposal Facilities: Comply with requirements specified in Section 01 7419 "Construction Waste Management and Disposal."
- G. 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 progress cleaning requirements in Section 01 7300 "Execution."
- H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

# 3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
  - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to 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 Section 01 1000 "Summary."
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 31 1000 "Site Clearing."
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
  - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
  - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
  - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
  - 4. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. 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.
- G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- H. Site Enclosure Fence: Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people 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.
  - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

- I. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- J. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- K. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- L. 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 incomplete, insulate temporary enclosures.
- M. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with 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.

# 3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  - 1. Protect porous materials from water damage.
  - 2. Protect stored and installed material from flowing or standing water.
  - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
  - 4. Remove standing water from decks.
  - 5. Keep deck openings covered or dammed.

- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  - 2. Keep interior spaces reasonably clean and protected from water damage.
  - 3. Periodically collect and remove waste containing cellulose or other organic matter.
  - 4. Discard or replace water-damaged material.
  - 5. Do not install material that is wet.
  - 6. Discard and replace stored or installed material that begins to grow mold.
  - 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
  - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  - 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
  - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
    - a. Hygroscopic materials that may support mold growth, including wood and gypsumbased products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
    - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    - c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

# 3.7 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. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  - At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 7700 "Closeout Procedures."

END OF SECTION 01 5000

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# SECTION 01 5100 - FIELD ENGINEERING

- PART 1 GENERAL
- 1.01 DESCRIPTION
  - A. Provide materials, equipment, and transportation and perform labor as required for construction surveying.
- 1.02 RELATED DOCUMENTS
  - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section.
- 1.03 RELATED WORK SPECIFIED ELSEWHERE
  - A. Section 312000: Site Grading
  - B. Section 334100: Storm Drainage
  - C. Section 321216: Asphalt Concrete Paving
- 1.04 STANDARD SPECIFICATIONS
  - A. Construction materials and methods shall be in accordance with the *Standard Specifications for Public Works Construction, 2021 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 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*.
- 1.06 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.

## 1.07 RECORD DOCUMENTS

- A. Comply with requirements of Division 1, "Project Record Documents" section.
- 1.08 QUALITY ASSURANCE
  - A. Retain a Land Surveyor, registered in the State of California, and acceptable to Architect / Engineer and Owner.
- PART 2 PRODUCTS

Not Used.

## PART 3 – EXECUTION

- 3.01 SURVEY CONTROL
  - A. Confirm location, condition, datum, horizontal and vertical control data for survey control points given on the Drawings, with the Topographic Mapping Surveyor.
    - 1. Protect survey control points during construction.
  - B. Establish additional survey control points throughout the work site in locations that will not be disturbed by construction activities.
    - 1. Locate control points such that there are at least two readily useable for each individual work area requiring surveying.
    - 2. Record locations of control points on Record Documents, including description and horizontal and vertical survey data.
  - C. Survey horizontal and vertical locations of existing buried conduits, pipelines and structures to be joined by, or which may conflict with, new construction and which have been exposed by potholing pursuant to requirements of individual technical specification sections; while exposed, observe and record conduit / pipe size and material. Redline this information to scale on a hardcopy of the applicable plan (or plan and profile) and provide to the Engineer for review and resolution of conflicts, if any. Allow a minimum of five (5) working days for review; more time may be required depending on the completeness of information provided and on the extent of the conflicts.
  - D. Layout and provide construction stakes for the work, including:
    - 1. Line and grade control for rough grading operations, including area grading, cut and fill slopes, subgrade for building pads and pavements.

- 2. Line and grade control for finish grading including drainage swales.
- 3. Line and grade control and grade certification prior to backfill for gravity pipelines and related structures.
- 4. Where called for on the Drawings, grade control and grade certification prior to backfill for pressure pipelines.
- 5. Line and grade control for concrete flatwork, walks, ramps, stairs, curbs, gutters, and walls.
- 6. Line and grade control for A.C. and concrete pavements.
- E. Survey and certify finish surface of completed building pad prior to any work involving plumbing, utilities, or foundations.
- F. Survey forms for concrete walks and ramps prior to ordering concrete to ensure that accessibility requirements for slope and cross-slope will be conformed with.
- G. Where design longitudinal gradient is less than 1% (1/8 inch per foot) survey gutter or curb and gutter forms prior to ordering concrete to ensure that design slope is being achieved.
- H. For asphalt concrete and concrete pavement, prior to scheduling placement of pavement confirm that surface of aggregate base course has been constructed to the design elevation and slope within tolerances specified in Section 02310, Subsection 3.03B.
- I. Provide record surveying pursuant to requirements of individual technical specification sections.

END OF SECTION

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# SECTION 01 6000 - PRODUCT REQUIREMENTS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. 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 comparable products.
- B. Related Requirements:
  - 1. Section 01 1000 "Summary" for Contractor requirements related to Owner-furnished products.
  - 2. Section 01 2500 "Substitution Procedures" for requests for substitutions.
  - 3. Section 01 4200 "References" for applicable industry standards for products specified.
  - 4. Section 01770 "Closeout Procedures" for submitting warranties.

# 1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," 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. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
  - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, inservice performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
  - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities

related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
  - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
  - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 3300 "Submittal Procedures."
- F. Substitution: Refer to Section 01 2500 "Substitution Procedures" for definition and limitations on substitutions.

# 1.3 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
  - 1. Resolution of Compatibility Disputes between Multiple Contractors:
    - a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.
    - b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

- 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
- 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
  - a. Name of product and manufacturer.
  - b. Model and serial number.
  - c. Capacity.
  - d. Speed.
  - e. Ratings.
- 3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

# 1.4 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

# 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at 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 determine compliance with the Contract Documents and that products are undamaged and properly protected.
- C. Storage:
  - 1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
  - 2. Store products to allow for inspection and measurement of quantity or counting of units.
  - 3. Store materials in a manner that will not endanger Project structure.

- 4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
- 5. Protect 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.

# 1.6 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: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
  - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 7700 "Closeout Procedures."

## PART 2 - PRODUCTS

## 2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, 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 meeting requirements of the Contract Documents.
- 4. Where products are accompanied by the term "as selected," Architect will make selection.
- 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
  - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.
- B. Product Selection Procedures:
  - 1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
  - 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
  - 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
  - 4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.

- a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
- b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
- 5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
  - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
- 6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
  - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
  - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
- 7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
  - a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 2500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

# 2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
- 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
- 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
- 3. Evidence that proposed product provides specified warranty.
- 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
- 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 01 3300 "Submittal Procedures."
  - 1. Form of Approval of Submittal: As specified in Section 01 3300 "Submittal Procedures."
  - 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

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# SECTION 01 7300 - EXECUTION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner's portion of the Work.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
  - 9. Correction of the Work.
- B. Related Requirements:
  - 1. Section 01 1000 "Summary" for coordination of, Owner-performed work, and limits on use of Project site.
  - 2. Section 01 3300 "Submittal Procedures" for submitting surveys.
  - Section 01 7700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
  - 4. Section 02 4119 "Selective Demolition" for demolition and removal of selected portions of the building.

#### 1.2 DEFINITIONS

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

# 1.3 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

- Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
- 2. 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. Operational elements include the following:
  - a. Primary operational systems and equipment.
  - b. Fire separation assemblies.
  - c. Air or smoke barriers.
  - d. Fire-suppression systems.
  - e. Plumbing piping systems.
  - f. Mechanical systems piping and ducts.
  - g. Control systems.
  - h. Communication systems.
  - i. Fire-detection and -alarm systems.
  - j. Conveying systems.
  - k. Electrical wiring systems.
  - I. Operating systems of special construction.
- 3. Other Construction Elements: Do not cut and patch other construction elements or 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. Other construction elements include but are not limited to the following:
  - a. Water, moisture, or vapor barriers.
  - b. Membranes and flashings.
  - c. Sprayed fire-resistive material.
  - d. Equipment supports.
  - e. Piping, ductwork, vessels, and equipment.
  - f. Noise- and vibration-control elements and systems.
- 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction 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.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of inplace materials. Use materials that are not considered hazardous.
- C. 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.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Existing Conditions: 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 service piping, and water-service piping; underground electrical services; and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, 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. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

- 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
- 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. 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 in accordance with requirements in Section 01 3100 "Project Management and Coordination."

# 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. Engage a land surveyor experienced in laying out the Work, using the following accepted surveying practices:

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

# 3.4 FIELD ENGINEERING

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

# 3.5 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.

- 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- 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 satisfactory results as judged by Architect. 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 of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
  - 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.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.

# 3.6 CUTTING AND PATCHING

- 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. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. 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.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 01 1000 "Summary."
- F. 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.
- G. 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 neatly to minimum 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: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable 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.
- H. 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 practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

- 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical 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, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. 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 and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

# 3.7 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel.
  - 1. Provide temporary facilities required for Owner-furnished, Contractor-installed products.
  - 2. Refer to Section 01 1000 "Summary" for other requirements for Owner-furnished, Contractor-installed products.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.
  - Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend

preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

#### 3.8 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three 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.
    - a. Use containers intended for holding waste materials of type to be stored.
  - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- 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: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 7419 "Construction Waste Management and Disposal."
- 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 ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

#### 3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 9113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 "Quality Requirements."

# 3.10 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. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

#### 3.11 CORRECTION OF THE WORK

- A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

- C. Restore permanent facilities used during construction to their specified condition.
- D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7300

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# SECTION 01 7419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition and construction waste.
  - 2. Recycling nonhazardous demolition and construction waste.
  - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
  - 1. Section 31 1000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

# 1.2 DEFINITIONS

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

#### 1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

# 1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for commencement of the Work.

# 1.5 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste. Include the following information:
  - 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. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated endof-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. 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. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.
- B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

# 1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste and Form CWM-4 for demolition waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with Section 02 4119 "Selective Demolition."
  - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  - 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

# PART 2 - PRODUCTS

# 2.1 RECYCLING RECEIVERS AND PROCESSORS

- A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:
  - 1. City of Lompoc Recycling Center, 1585 N 'V' Street.

#### 2.2 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

#### PART 3 - EXECUTION

#### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Section 01 5000 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.

2. Comply with Section 01 5000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

# 3.2 SALVAGING DEMOLITION WASTE

- A. Comply with requirements in Section 02 4119 "Selective Demolition" for salvaging demolition waste.
- B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  - 3. Store items in a secure area until installation.
  - 4. Protect items from damage during transport and storage.
  - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items for Sale and Donation: Not permitted on Project site.
- D. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.
- E. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- G. Plumbing Fixtures: Separate by type and size.
- H. Lighting Fixtures: Separate lamps by type and protect from breakage.
- I. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL
  - A. General: Recycle paper and beverage containers used by on-site workers.

- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - 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 from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

# 3.4 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- C. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- D. Metals: Separate metals by type.
  - 1. Structural Steel: Stack members according to size, type of member, and length.
  - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- E. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

- G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- H. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
- I. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
  - 1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- J. Carpet Tile: Remove debris, trash, and adhesive.
  - 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- K. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.
- L. Conduit: Reduce conduit to straight lengths and store by material and size.
- M. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

# 3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
- D. Paint: Seal containers and store by type.

# 3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, 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. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.
- C. Burning: Do not burn waste materials.

# 3.7 ATTACHMENTS

- A. Form CWM-1 for construction waste identification.
- B. Form CWM-2 for demolition waste identification.
- C. Form CWM-3 for construction waste reduction work plan.
- D. Form CWM-4 for demolition waste reduction work plan.
- E. Form CWM-7 for construction waste reduction progress report.
- F. Form CWM-8 for demolition waste reduction progress report.

END OF SECTION 01 7419

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

\* Insert units of measure.

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

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

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

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

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FORM CWM-8: DEMOLITION WASTE REDUCTION PROGRESS REPORT								
MATERIAL CATEGORY	GENERATION POINT	TOTAL QUANTITY OF WASTE TONS (TONNES) (A)	QUANTITY SALV ESTIMATED TONS (TONNES)	OF WASTE AGED ACTUAL TONS (TONNES) (B)	QUANTITY RECY ESTIMATED TONS (TONNES)	OF WASTE /CLED ACTUAL TONS (TONNES) (C)	TOTAL QUANTITY OF WASTE RECOVERED TONS (TONNES) (D = B + C)	TOTAL QUANTITY OF WASTE RECOVERED % (D / A x 100)
Asphaltic Concrete Paving				(2)				
Concrete								
Brick								
CMU								
Lumber								
Plywood and OSB								
Wood Paneling								
Wood Trim								
Miscellaneous Metals								
Structural Steel								
Rough Hardware								
Insulation								
Roofing								
Doors and Frames								
Door Hardware								
Windows								
Glazing								
Acoustical Tile								
Carpet								
Carpet Pad								
Demountable Partitions								
Equipment								
Cabinets								
Plumbing Fixtures								
Piping								
Supports and Hangers								
Valves								
Sprinklers								
Mechanical Equipment								
Electrical Conduit								
Copper Wiring								
Light Fixtures								
Lamps								
Lighting Ballasts								
Electrical Devices								
Switchgear and Panelboards								
Transformers								
Other:								

05/10

# **SECTION 01 7700 - CLOSEOUT PROCEDURES**

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.

# B. Related Requirements:

- 1. Section 01 2900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
- 2. Section 01 3233 "Photographic Documentation" for submitting Final Completion construction photographic documentation.
- 3. Section 01 7823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
- 4. Section 01 7839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

# 1.2 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

# 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

# 1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

# 1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

# 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
  - 5. Submit testing, adjusting, and balancing records.
  - 6. Submit sustainable design submittals not previously submitted.
  - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 3. Complete startup and testing of systems and equipment.
  - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.

- 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 7900 "Demonstration and Training."
- 6. Advise Owner of changeover in utility services.
- 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
- 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
- 9. Complete final cleaning requirements.
- 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after 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. 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.

# 1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
  - 1. Submit a final Application for Payment in accordance with Section 01 2900 "Payment Procedures."
  - 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  - 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  - 4. Submit Final Completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  - 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

# 1.8 LIST OF INCOMPLETE ITEMS

- A. Organization 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.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first, listed by room or space number.
  - 2. Organize items applying to each space by major element, including categories for ceilings, 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.
  - 4. Submit list of incomplete items in the following format:
    - a. MS Excel Electronic File: Architect will return annotated file, or
    - b. PDF Electronic File: Architect will return annotated file.

# 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  - 1. Submit to Architect by email attachment or file transfer service to Architect.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

# 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.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

# PART 3 - EXECUTION

# 3.1 FINAL CLEANING

- A. General: Perform 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 inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site 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 not planted, mulched, or paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. 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.
    - f. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - g. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
    - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

- i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
- j. Remove labels that are not permanent.
- k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- I. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- n. Clean ducts, blowers, and coils.
- o. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
- p. Clean strainers.
- q. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 01 7419 "Construction Waste Management and Disposal."
- 3.2 REPAIR OF THE WORK
  - A. Complete repair and restoration operations required by Section 01 7300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 01 7700

# SECTION 01 7823 - OPERATION AND MAINTENANCE DATA

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory manuals.
  - 2. Emergency manuals.
  - 3. Systems and equipment operation manuals.
  - 4. Systems and equipment maintenance manuals.
  - 5. Product maintenance manuals.
- B. Related Requirements:
  - 1. Section 01 3300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### 1.2 DEFINITIONS

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

# 1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
  - 1. Submit on digital media acceptable to Architect by email or file transfer service to Architect. Enable reviewer comments on draft submittals.

- C. Initial Manual Submittal: Submit draft copy of each manual at least 10 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 5 days before commencing demonstration and training. Architect will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 3 days of receipt of Architect's comments and prior to commencing demonstration and training.
- E. Comply with Section 01 7700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

# 1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

# 1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

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

### 1.6 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.

- 7. System, subsystem, or equipment failure.
- 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
  - 2. Shutdown instructions for each type of emergency.
  - 3. Operating instructions for conditions outside normal operating limits.
  - 4. Required sequences for electric or electronic systems.
  - 5. Special operating instructions and procedures.

# 1.7 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - 2. Performance and design criteria if Contractor has delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
  - 1. Product name and model number. Use designations for products indicated on Contract Documents.
  - 2. Manufacturer's name.

- 3. Equipment identification with serial number of each component.
- 4. Equipment function.
- 5. Operating characteristics.
- 6. Limiting conditions.
- 7. Performance curves.
- 8. Engineering data and tests.
- 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
  - 1. Startup procedures.
  - 2. Equipment or system break-in procedures.
  - 3. Routine and normal operating instructions.
  - 4. Regulation and control procedures.
  - 5. Instructions on stopping.
  - 6. Normal shutdown instructions.
  - 7. Seasonal and weekend operating instructions.
  - 8. Required sequences for electric or electronic systems.
  - 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed and identify color coding where required for identification.

## 1.8 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent,

and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

- I. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of maintenance manuals.

## 1.9 PRODUCT MAINTENANCE MANUALS

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

OPERATION AND MAINTENANCE DATA

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 7823

# SECTION 01 7839 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 01 7300 "Execution" for final property survey.
  - 2. Section 01 7700 "Closeout Procedures" for general closeout procedures.
  - 3. Section 01 7823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

## 1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up record prints.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous recordkeeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

# 1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 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 provide information for preparation of corresponding 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 acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding photographic documentation.
  - 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.
    - 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.
    - I. 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 and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  - 4. Mark record prints 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. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

- 1. Format: Annotated PDF electronic file with comment function enabled.
- 2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
- 3. Refer instances of uncertainty to Architect for resolution.
- 4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
  - a. See Section 01 3100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
  - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Format: Annotated PDF electronic file with comment function enabled.
  - 2. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

# 1.4 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. Note related Change Orders and Record Drawings where applicable.
- B. Format: Submit record specifications as annotated PDF electronic file.

## 1.5 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. 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.
- C. Format: Submit Record Product Data as annotated PDF electronic file.
  - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

# 1.6 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.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
  - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

# 1.7 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store Record Documents 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 7839

## **SECTION 01 7900 - DEMONSTRATION AND TRAINING**

### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.

## 1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator and instructor as applicable.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.

## 1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name of Architect.
    - c. Name of Contractor.

- 2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
- 3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
- 4. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Section 01 7823 "Operation and Maintenance Data."

## 1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 4000 "Quality Requirements," experienced in operation and maintenance procedures and training.

# 1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

## 1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

- 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
  - a. System, subsystem, and equipment descriptions.
  - b. Performance and design criteria if Contractor is delegated design responsibility.
  - c. Operating standards.
  - d. Regulatory requirements.
  - e. Equipment function.
  - f. Operating characteristics.
  - g. Limiting conditions.
  - h. Performance curves.
- 2. Documentation: Review the following items in detail:
  - a. Emergency manuals.
  - b. Systems and equipment operation manuals.
  - c. Systems and equipment maintenance manuals.
  - d. Product maintenance manuals.
  - e. Project Record Documents.
  - f. Identification systems.
  - g. Warranties and bonds.
  - h. Maintenance service agreements and similar continuing commitments.
- 3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - I. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:

- a. Alignments.
- b. Checking adjustments.
- c. Noise and vibration adjustments.
- d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning.
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

### 1.8 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 7823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

### 1.9 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Owner will furnish an instructor to describe Owner's operational philosophy.

- 2. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 7900

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# SECTION 02 4116 - STRUCTURE DEMOLITION

### PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Demolition and removal of buildings and site improvements.
  - 2. Removing below-grade construction.
  - 3. Disconnecting, capping or sealing, and abandoning in-place site utilities.
- B. Related Requirements:
  - 1. Section 01 1000 "Summary" for use of the premises and phasing requirements.
  - 2. Section 01 3200 "Construction Progress Documentation" for preconstruction photographs taken before building demolition.
  - 3. Section 02 4119 "Selective Demolition" for partial demolition of buildings, structures, and site improvements.
  - 4. Section 31 1000 "Site Clearing" for site clearing and removal of above- and below-grade site improvements not part of building demolition.

### 1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.

### 1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and. Indicate proposed locations and construction of barriers.

- 1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.
- C. Schedule of Building Demolition Activities: Indicate the following:
  - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
  - 2. Temporary interruption of utility services.
  - 3. Shutoff and capping or re-routing of utility services.
- D. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 01 3233 "Photographic Documentation." Submit before the Work begins.
- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- 1.5 CLOSEOUT SUBMITTALS
  - A. Inventory: Submit a list of items that have been removed and salvaged.
- 1.6 QUALITY ASSURANCE
  - A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- 1.7 FIELD CONDITIONS
  - A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
  - B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
    - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
    - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
      - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
  - C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
    - 1. Before building demolition, Owner will remove the following items:

- a. Loose furniture.
- b. Computers, phones, projectors, flat screens, and other technology items.
- 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- D. Hazardous Materials: Present in buildings and structures to be demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
  - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
  - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- E. On-site storage or sale of removed items or materials is not permitted.

# 1.8 COORDINATION

A. Arrange demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied buildings.

# PART 2 - PRODUCTS

# 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

# 2.2 SOIL MATERIALS

A. Satisfactory Soils: Comply with requirements in Section 31 2000 "Earth Moving."

# PART 3 - EXECUTION

- 3.1 EXAMINATION
  - A. Verify that utilities have been disconnected and capped before starting demolition operations.

- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of 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 building demolition operations.
- D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- E. Inventory and record the condition of items to be removed and salvaged.

## 3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.
- B. Salvaged Items: Comply with the following:
  - 1. Clean salvaged items of dirt and demolition debris.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.

## 3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Utilities to Be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
  - 1. Arrange to shut off utilities with utility companies.
  - 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
  - 3. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
  - 4. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

# 3.4 PROTECTION

A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.

- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of demolition.
- C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations.
  - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
  - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
    - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 01 5000 "Temporary Facilities and Controls."
  - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
  - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
  - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
  - 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
  - 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
  - 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

# 3.5 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
  - 2. Maintain fire watch during and for at least two hours after flame-cutting operations.
  - 3. Maintain adequate ventilation when using cutting torches.

- 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
  - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Explosives: Use of explosives is not permitted.

## 3.6 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Salvage: Items to be removed and salvaged are indicated below:
  - 1. Chalkboards.
  - 2. Tackboards.
  - 3. Marker boards.
  - 4. Fire Alarm devices.
- D. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
  - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely.
- E. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.
  - 1. Fill abandoned utility structures with satisfactory soil materials according to backfill requirements in Section 31 2000 "Earth Moving."

### 3.7 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Section 31 2000 "Earth Moving."
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

### 3.8 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.
- 3.9 DISPOSAL OF DEMOLISHED MATERIALS
  - A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 7419 "Construction Waste Management and Disposal."
    - 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.
  - B. Do not burn demolished materials.

#### 3.10 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
  - 1. Clean roadways of debris caused by debris transport.

#### END OF SECTION 02 4116

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# SECTION 02 4119 - SELECTIVE DEMOLITION

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Demolition and removal of selected portions of building or structure.
  - 2. Demolition and removal of selected site elements.
  - 3. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
  - 1. Section 01 1000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
  - 2. Section 01 7300 "Execution" for cutting and patching procedures.
  - 3. Section 01 3516 "Alteration Project Procedures" for general protection and work procedures for alteration projects.
  - 4. Section 31 1000 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

### 1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

### 1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property. Indicate proposed locations and construction of barriers.
- C. 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 Owner's 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. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 01 3233 "Photographic Documentation." Submit before Work begins.
- E. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

### 1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

#### 1.6 FIELD 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.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- 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 suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner 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.

#### 1.7 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

### PART 2 - PRODUCTS

- 2.1 PERFORMANCE REQUIREMENTS
  - A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
  - B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

## 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

# 3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 5000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, 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.
- C. Remove temporary barricades and protections where hazards no longer exist.

# 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. 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 portable fire-suppression devices during flame-cutting operations.
  - 5. Maintain fire watch during and for at least two hours after flame-cutting operations.
  - 6. Maintain adequate ventilation when using cutting torches.
  - 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  - 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 7419 "Construction Waste Management and Disposal."
- B. 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.
- C. 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 delivery to Owner.
  - 4. Transport items to Owner's storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
  - 1. Clean and repair items to functional condition adequate for intended reuse.
  - 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.
- E. 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 sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- C. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 7419 "Construction Waste Management and Disposal."
  - 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.
  - 4. Comply with requirements specified in Section 01 7419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

#### 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.

END OF SECTION 02 4119

# SECTION 10 1423 - PANEL SIGNAGE

### 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. Panel signs.
- B. Related Requirements:
  - 1. Section 01 5000 "Temporary Facilities and Controls" for temporary Project identification signs and for temporary informational and directional signs.

## 1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
  - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

- 1. Panel Signs: Full-size Sample.
- 2. Full-size Samples, if approved, will be returned to Contractor for use in Project.
- E. Product Schedule: For panel signs. Use same designations indicated on Drawings or specified.

## 1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

## 1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

## 1.7 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

### 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image.
    - c. Separation or delamination of sheet materials and components.
  - 2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Accessibility Standard: Comply with applicable provisions in CBC Chapter 11B.

## 2.2 PANEL SIGNS

- A. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  - 1. <u>Manufacturers:</u> Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. <u>ASI Sign Systems, Inc</u>.
    - b. <u>Diskey Architectural Signage Inc</u>.
    - c. <u>Vista System</u>.
  - 2. Engraved Plastic-Laminate Sign: Plastic-laminate face laminated to contrasting phenolic core to produce composite sheet.
    - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
    - b. Engraved Graphics: Characters engraved through plastic-laminate face sheet to expose contrasting phenolic core.
    - c. Plastic-Laminate Color and Pattern: As selected by Architect from manufacturer's full range.
  - 3. Sign-Panel Perimeter: Finish edges smooth.
    - a. Edge Condition: As indicated on Drawings.
    - b. Corner Condition in Elevation: Rounded to radius indicated.
  - 4. Mounting: Manufacturer's standard method for substrates indicated with two-face tape.
  - 5. Text and Typeface: Accessible raised characters and Braille typeface matching Architect's sample. Finish raised characters to contrast with background color, and finish Braille to match background color.

# 2.3 PANEL-SIGN MATERIALS

- A. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

## 2.4 ACCESSORIES

A. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

## 2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  - 1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  - 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
  - 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  - 5. Internally brace signs for stability, to meet structural performance loading without oilcanning or other surface deformation, and for securing fasteners.
  - 6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

## 2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
  - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Accessible Signage: Install in locations on walls as indicated on Drawings and according to the accessibility standard.
- C. Mounting Methods:
  - 1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
- D. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

# 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 1423

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### **SECTION 260000 - GENERAL ELECTRICAL PROVISIONS**

#### PART 1 - GENERAL

- A. The general contract provisions of Section 011000 apply to this section and take precedent over this section in case of conflict.
- 1.01 GENERAL PROVISIONS
  - A. This division supplements the applicable requirements of other divisions.

#### 1.02 DEFINITIONS

- A. For the purposes of Division 260000, the following definitions apply:
  - 1. Provide: Furnish and install.
  - 2. Indicated: As shown on the drawings or specified herein.
  - 3. Circuit Designation: Panel designation and circuit number, i.e., CHA-13.

### 1.03 SCOPE OF WORK

- A. The Specifications for Work of Division 260000 include, but are not limited to the following sections:
  - 260000 General Electrical Provisions
  - 260030 Tests and Identification
  - 260050 Basic Electrical Materials and Methods
  - 260051 Common Work Results for Electrical
  - 260060 Minor Electrical Demolition for Remodeling
  - 260061 Grounding & Bonding
  - 260075 Electrical Identification
  - 260111 Conduits
  - 260115 Wireways
  - 260118 Duct Bank
  - 260120 Conductors & Cables
  - 260130 Electrical Boxes
  - 260142 Nameplates and Warning Signs
  - 260190 Support Devices
  - 260720 Fire Alarm Detection Systems
- B. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this division, complete, as shown on the

drawings and/or specified herein. Work includes, but is not necessarily limited to the following:

- 1. Examine all divisions for related work required to be included as work under this division.
- 2. General provisions for electrical work.
- 3. Secondary underground conduit system for electrical service to buildings and secondary feeders as shown on the Drawings.
- 4. Provision of precast concrete pull boxes.
- 5. Service entrance panelboards and feeders.
- 6. Feeders, disconnects, and connection to equipment.
- 7. Branch circuit wiring, connections and devices for all equipment, outlets, and lighting systems.
- 8. Lighting fixtures, lamps, ballasts, transformers, hangers, supports, standards, bases and accessories.
- 9. Wiring and control equipment for mechanical systems.
- 10. Electrical outlets and connections to all motors and equipment.
- 11. Fire alarm system complete with conduits, wiring, equipment, and connections.
- 12. Removal of existing electrical systems and equipment which will be affected by the work of this Contract and reinstallation of same as shown or as is required.
- 13. Work in existing facility and shut down of existing services shall be performed only at times approved.
- 14. All cutting and patching required for the electrical system installation.
- 15. Temporary power during construction.
- C. Related Work Specified Elsewhere:
  - 1. Motors and their installation.
  - 2. Control wiring and conduit for heating, ventilating and air conditioning.

- D. Work Not In Contract (N.I.C.):
  - 1. Telephone instruments.
- E. Coordination
  - 1. The following supplements are additional General Requirements pertaining to work of this Division. Provisions of Division 01 General Requirements shall remain in effect.
    - a) Coordinate work of various sections of Division 26.
    - b) Coordinate work of this Division 26 with work of Divisions 02 through 25.

### 1.04 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI).
- B. Association of Edison Illuminating Companies (AEIC).
- C. Electrical Testing Laboratories (ETL).
- D. Illuminating Engineering Society (IES).
- E. Institute of Electrical and Electronic Engineers (IEEE).
- F. Insulated Cable Engineers Association (ICEA).
- G. National Electrical Manufacturers Association (NEMA).
- H. National Fire Protection Association (NFPA).
- I. Underwriters Laboratories, Inc. (UL).
- J. California State Fire Marshal (CSFM).

### 1.05 QUALITY ASSURANCE

- A. Regulations: All the electrical equipment and materials, including their installations, shall conform to the following applicable latest codes and standards:
  - 1. National Electric Code, Latest Adopted Edition (NEC), 2020 unless a more current version has been adopted.
  - 2. California Electric Code, Latest Adopted Edition (CEC), 2022
  - 3. National Fire Alarm Code (NFPA) 72.
  - 4. Local and State Fire Marshal.

- 5. Occupational Safety and Health Act (OSHA).
- 6. Requirements of the Serving Utility Company.
- 7. Local Codes and Ordinances.
- 8. Requirements of the Office of the California State Architect (OSA).
- 9. California Administrative Code, Title 8, Chapter 4, Industrial Safety Orders.
- 10. California Administrative Code, Title 24.
- 11. County of Santa Barbara Codes and Regulations.
- B. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply. In instances where plans and specifications are at variance or conflict the most restrictive requirement shall apply. Contractor shall be responsible for all his associated work and materials and also the work and materials of related or affected trades.
- C. Contractor's Expense: Obtain and pay for all required bonds, insurance, licenses, and pay for all taxes, fees and utility charges required for the electrical work.
- D. Testing and Adjustment:
  - 1. Perform all necessary tests required to ascertain that the electrical system has been properly installed, that the power supply to each item of equipment is correct, and that the system is free of grounds, ground faults, and open circuits, that all motors are rotating in the proper directions, and such other tests and adjustments as may be required for the proper completion and operation of the electrical system.
  - 2. If, during the course of testing, it is found that system imbalance is in excess of 20%, rearrange single-pole branch circuit in lighting and receptacle panels to bring system balance to within 20% on all phases. Record all such changes on the panelboard schedule and submit a summary of changes to the Engineer on the record drawings.

### 1.06 SUBMITTALS

- A. Procedure: In accord with Section 260000.
- B. Show drawings: Detailed shop drawings for the following equipment:
  - (1) Distribution panelboards.
  - (2) Circuit breaker load center.
  - (3) Fire alarm system.

- C. Product data: Detailed manufacturer's data for:
  - (1) Cabinets.
  - (2) Concrete pull boxes.
  - (3) Lighting fixtures and associated equipment.
- D. Test results for the following:
  - (1) Fire alarm system.
  - (2) Circuit breakers.
  - (3) Grounding systems.
  - (4) Cables.
- E. Include sufficient information to indicate complete compliance with Contract Documents. Include illustrations, catalog cuts, installation instructions, drawings, and certifications. On each sheet show manufacturer's name or trademark.
- F. Operating, maintenance, and instruction data for:
  - (1) Switchboards.
  - (2) Fire alarm and detection.
- G. Instruction materials:
  - (1) Provide at the time of personnel instruction period three bound copies of instruction manuals for the systems used on this project.
  - (2) Include the following (minimum) information in each copy of instruction manual:
    - (a) Manufacturers' names and addresses.
    - (b) Serial numbers of items furnished.
    - (c) Catalog cuts, exploded views and brochures, complete with technical and performance data for all equipment, marked to indicate actual items furnished and intended use.

# 1.07 OWNER'S PERSONNEL INSTRUCTIONS

- A. Prior to completion of the contract, and at the Owner's convenience, instruct verbally and demonstrate to the Owner's personnel, the operation of the systems as listed under operating, maintenance, and instructional data and/or emergency generator, automatic transfer switch and fire alarm annunciator panel.
- 1.08 CLEANING
  - A. Clean exterior surfaces of equipment and remove all dirt, cement, plaster and other debris. Protect interior of equipment from dirt during construction and clean thoroughly before energizing.
  - B. Clean out cracks, corners and surfaces on equipment to be painted. Remove grease and oil spots so that paint may be applied without further preparation.

- 1.09 PROJECT RECORD DOCUMENTS Prepare the following and submit to the engineer before final acceptance:
  - A. Mark Project Record Documents daily to indicate all changes made in the field.
    - 1. In addition to general requirements of Project Record Drawings, indicate on drawings, changes of equipment locations and ratings, trip sizes, and settings on circuit breakers, alterations in raceway runs and sizes, changes in wire sizes, circuit designations, installation details, one-line diagrams, control diagrams and schedules.
  - B. Use green to indicate deletions and red to indicate additions.
    - 1. Use the same symbols and follow the same drafting procedures used on the Contract Drawings.
  - C. Locate underground conduit stubbed-out for future use, underground feeder conduits, and feeder pull box locations using building lines by indicating on the Project Record Drawings.
  - D. At the completion of underground conduit installation provide underground conduit record documents to owner's representative.
  - E. Two copies, in binder form, of all test results as required by these specifications 260030.
  - F. Two copies of local and/or state code enforcing authorities' final inspection certificates.
  - G. Fire alarm system records and testing reports as outlined in NFPA 72, Chapter 10.
  - H. Two copies, in binder form, of electrical equipment cut sheets, manufacturer's installation instructions, warranty certificates, and product literature for all products utilized on project.
- 1.10 SERVICE INTERRUPTIONS AND UTILITY
  - A. Coordinate with the Owner the interruption of services necessary to accomplish the work.
  - B. Coordinate with the utility company all work associated with power and communications distribution systems and service entrance equipment.
  - C. Electrical contractor shall supply temporary power for all trades.
- 1.11 MINIMUM SPECIFICATION REQUIREMENTS (ALL WORK OF DIVISION 260000)
  - A. As a minimum Specification requirement, all materials and methods shall comply with applicable governing codes.

### 1.12 PENETRATION SEALING

A. Seal penetration through exterior walls and fire rated walls, floors, ceilings, and roofs with 3M Firestopping materials of fire rating capacity per architectural plans and UBC requirements.

#### 1.13 PLACING EQUIPMENT IN SERVICE

A. Do not energize or place electrical equipment in service until all interested parties have been duly notified and are present or have waived their rights to be present. Where equipment to be placed in service involves service or connection from another contractor of the Owner, notify the Owner in writing when the equipment will be ready. Notify the Owner two weeks in advance of the date the various items of equipment will be complete.

#### 1.14 OWNER-FURNISHED ITEMS

- A. Pick up Owner-furnished items and handle, deliver, install, and make all final connections.
  - 1. Assume responsibility for the items when consigned at the storage facility in accord with requirements of the Contract Documents.

#### 1.15 ELECTRIC ITEM LOCATION

A. Electrical drawings are generally diagrammatic. Verify equipment sizes with shop drawings and manufacturers' data and coordinate location layout with other trades. Notify Owner of any changes of location requirements prior to installation.

#### 1.16 DEMOLITION

- A. Scope: Provide and perform demolition, preparatory and miscellaneous work as indicated and specified, complete.
- B. Principle Items of Work:
  - 1. Demolition and removal of existing electrical conduit, wiring and equipment required to complete the project.
  - 2. Preparation of the existing building to receive or connect the new work.
  - 3. Miscellaneous demolition, cutting, alteration, and repair work in the existing building necessary for the completion of the entire project.
  - 4. Disconnecting and reconnection of electrical equipment as required by the construction modifications.

- C. Existing Conditions: Make a detailed survey of the existing conditions pertaining to the work. Check the locations of all existing structures, equipment and wiring (branch circuiting and controls).
- D. Salvage and Disposal: All removed material other than items to be reused shall be returned to the Owner or disposed of in accordance with instructions from the Owner's representative. Disposal shall be done in accordance with EPA and governing body requirements and regulations. Contractor shall pay all fees and charges for disposal.

# 1.17 ELECTRICAL WORKMANSHIP REQUIREMENTS

- A. It is required that all electrical construction of this Contract be performed by State of California licensed journeyman electricians.
  - 1. Before each journeyman electrician commences work, deliver to Owner at project site a photocopy of journeyman's valid State of California license.
- B. All electrical systems shall be installed in a neat and workmanlike manner per National Electrical Code requirements and ANSI approved NEIS National Electrical Installation Standards.

### 1.18 DESIGN CHANGES AFTER AWARD OF BID

- A. When a change in the quantity or size of conductors is made, the conduit size will remain in accordance with that indicated in the original contract drawings rather than the drawing symbol conduit table. When code permits, provide conductor insulation 'THWN' where required to maintain conduit fill conformance with the NEC.
- 1.19 CREDITS AND EXTRAS (in case of conflict the provisions of Section 011000 shall govern)
  - A. Material prices shall be in accordance with the 2020 Means Electrical Cost Data, or submitted manufacturer's or supplier's quotes, plus tax and 1% cartage.
  - B. Labor rates shall be based on local union scale and shall include only benefits required by the union.
  - C. The maximum charged for the Foreman or General Foreman shall be the minimum required by the local union.
  - D. The maximum amount of labor charged to accomplish the required work shall be based on 2020 Means Electrical Cost Data.
  - E. The amount of added direct labor cost shall not exceed 30% of the actual labor cost and shall include insurance, taxes, small tools, payroll expenses, office supervision, management development, training, and etc.

- F. Rental cost or rates shall be based on the American Equipment Dealers rated manual, less Contractor's discount. Copies of the Equipment Rental Invoices shall be submitted to the Architect.
- G. The Contractor and the Architect shall negotiate any cost item where it can be shown that the job conditions are beyond the scope of the above listed manuals. In this case, the burden of proof shall be the responsibility of the Contractor. He shall provide invoices, detailed breakdowns, confirmation by the resident inspector of existing conditions and etc., as may be required to justify his claim.
- H. The fee for the prime electrical sub-contractor shall be in accordance with the general and supplemental conditions of the specification, but shall not exceed 5% overhead and 5% profit. No additional overhead and profit shall be allowed for sub-contractors to the prime sub-contractor.
- I. The Contractor shall submit detailed material and labor cost breakdown on all cost changes to the contract in the form directed by the Architect.
- J. For credit changes to the contract, the fee shall not be included, except where additions and deductions are made by a single change order. The cost shall be based on the net change in material and labor prior to determining the fee.

# 1.20 MATERIAL AND EQUIPMENT SUBSTITUTION

- A. Where two or more trade names or manufacturers are mentioned, selection shall be made from the group listed for use in the base bid. The order in which names are listed is not intended to be any indication of preference.
- B. Where a single manufacturer, product or trade name is stated, that manufacturer, product or trade name shall be used in the base bid. The use of other manufacturers, products or trade names will be considered (unless that product is indicated for no substitution) only if submitted as alternate items at the time of bidding, with evidence of equality and a statement of net price difference as compared to the specified item. The Architect and Owner reserve the right to review such submittals and to determine the acceptability for use.
- C. Equipment other than that specified will be accepted only when written approval is given by the Architect, in accordance with Division 01.
- D. The Contractor shall be held responsible for all physical changes in piping, equipment, etc. resulting from equipment substitution and likewise bear any increased cost of other trades in making said substitution. Approval by the Architect of equipment other than that specified does not relieve this Contractor of this responsibility.

# 1.21 REQUESTS FOR INFORMATION

A. The contractor shall submit all requests for information (RFI's) on the attached form.

END OF SECTION 260000

# **REQUEST FOR INFORMATION**

То:	RFI #
Attention	Date Sent
Project:	Project #
Sheet Number:	Bulletin or Delta Number:
Spec. Section	Sheet Details:
REQUEST FOR INFORMATION	:
CONTRACTOR'S RECOMMENI	DATION:
Requested by:	
The above information is requested	l on or before:
Cost Impact: Yes No Possible	Possible Time Impact: Yes No Possible
Response:	
Response by:	
Name:	Signature:
Date:	

# SECTION 260030 - TESTS AND IDENTIFICATION

### PART 1 - GENERAL

- 1.01 SECTION INCLUDES
  - A. Tests and identification.

#### 1.02 SUBMITTALS

- A. In accord with Section 260000.
- B. All test values.

#### 1.03 DEFINITION

A. Circuit designation: This term is construed to mean panel designation and circuit number; i.e., CHA-13.

### 1.04 TESTS AND ADJUSTMENTS

- A. Prior to energizing, test all systems. Test to ensure systems are:
  - 1. Free from short circuits and grounds.
  - 2. Free from mechanical and electrical defects.
- B. Circuit breakers.
  - 1. Visual and mechanical inspection:
    - a. Compare nameplate data with Drawings and Specifications.
    - b. Inspect circuit breaker for correct mounting.
    - c. Operate circuit breakers to ensure smooth operation.
    - d. Inspect case for cracks or other defects.
    - e. Verify tightness of accessible bolted connections and/or cable connections by calibrated torque-wrench method in accord with manufacturer's published data.
    - f. Inspect mechanism contacts and arc chutes in unsealed units.
- C. Adjust all installation and equipment for their intended use and rating as defined in manufacturer's specifications and test procedures.
- D. Ground systems:
  - 1. Visual and mechanical inspection: Verify ground system is in compliance with Drawings and Specifications.

. . .

- 2. Electrical tests:
  - a. Perform fall-of-potential test or alternative in accord with IEEE 81 on the main ground electrode or system.
  - b. Perform point-to-point tests to determine resistance between main ground system and all major electrical equipment frames, system neutral, and/or derived neutral points.
- 3. Test values:
  - a. Resistance between main ground electrode and ground shall be no greater than 10 ohms. Additional rods shall be installed and bonded to grounding system and driven to a depth of 50 ft. or refusal, whichever comes first.
  - b. Investigate point-to-point resistance values which exceed 0.5 ohm.
  - c. Record all test values and provide certified copies to Owner.
- E. Cables:
  - 1. Make insulation resistance tests on all power cables, using a self-contained instrument such as the direct-indicating ohmmeter of the generator type, or "megger" such as manufactured by J.G. Biddle Company, or Owner-approved equivalent. Insulation resistance values shall be at least 75% of shop test records.
    - a. Apply the following test voltages for 1 minute, except where specified otherwise herein, in accord with procedure recommended by manufacturer of test equipment and as specified herein.

Rated Circuit Voltage	Megger Voltage (DC)	Minimum Megger Reading
600 volts	500 volts	600 kilohms
1000 volts	500 volts	1 megohm
15,000 volts	1000 volts	15 megohms

- 2. Record all test values and provide certified copies to Owner.
- 3. Replace cables not meeting specified resistance values.
- 4. Test cable mechanical connections to manufacturer's recommended values using a calibrated torque wrench. In the absence of manufacturer's data use Table 10.1.
- F. Miscellaneous tests:
  - 1. Wiring: check all control circuits for continuity and conformance with wiring diagrams furnished by Owner and manufacturers.

- 2. Polarity tests: Make continuity and polarity tests on all current and potential transformers to determine whether polarity is as indicated on drawings, and the circuit is continuous.
- 3. Phasing tests: Identify phases of all switchgear and power cables by stenciling switchgear and tagging cables with approved tags, so that phases can be identified for connecting to proper phase sequence.

### 1.05 LABELING AND IDENTIFICATION

- A. Provide engraved plastic nameplates on all electrical distribution equipment shown on single-line diagram, and on control panels, terminal cabinets, and separately mounted circuit breakers, disconnects, and starters.
- B. Provide equipment and circuit designation on nameplates with minimum letter and plate sizes as indicated.
- C. Provide engraved plastic nameplates with ¼" minimum height letters indicating:
  - 1. Circuit designation at branch overcurrent devices in distribution panelboards, switchboards, and motor control centers.
  - 2. Circuit designation of panel, equipment-controlled or device-controlled on disconnect switches and on circuit breakers, starters, and controls which are individually enclosed.
  - 3. Voltage rating and circuit designation of all outlets larger than 120V, 20A rating and more than 2 poles.
  - 4. Designation of control and terminal cabinets.
  - 5. Designation of each contactor and relay in control cabinets.
  - 6. Equipment designation on front of switchboards, distribution panelboards, branch circuit panelboards, and load centers.
- D. Secure nameplates with at least two rivets. Cementing and adhesive installation is not acceptable.
- E. Provide two copies of a typewritten directory for each branch circuit panelboard, showing each circuit and its use. Attach one copy to panelboard door and deliver the other copy to Owner.
- F. Provide caution label on branch circuit panelboards with integral control compartments. Caution label shall be red with white letters reading "CAUTION, EXTERNAL CONTROL VOLTAGE CIRCUIT WITHIN THIS PANEL."

- G. Conductor identification:
  - 1. Feeders: Identify with the corresponding circuit designation at over-current device and load ends, at all splices, and in pull boxes.
  - 2. Branch circuits: Identify with corresponding circuit designation at overcurrent device and at all splices.
  - 3. Control wires: Identify with indicated number and or letter designation at all terminal points and connections, including manufacturer pre-wired control sections and cabinets.
  - 4. Alarm and detection wires: Identify with indicated wire and mnemonics numbers at all connections, terminal points, and coiled conductors within cabinets for future termination by Owner.
  - 5. Voice/data communication cabling: Identify with indicated wire and mnemonics numbers at all connections, terminal points, and coiled conductors within cabinets for future termination by Owner.
  - 6. For identification of conductors, use heat shrinkable white marking sleeves such as Brady Permasleeve with type written identification.

# END OF SECTION 260030

### SECTION 260050 - BASIC ELECTRICAL MATERIALS AND METHODS

#### PART 1 - GENERAL

- 1.01 DESCRIPTION: Division 01 applies to this Section. This Section contains general requirements for the Sections in Division 26.
  - A. Related Work Not in Division 26: Refer to individual Division 26 Sections.
- 1.02 QUALITY ASSURANCE:
  - A. Codes: Entire installation shall comply with requirements of authorities having jurisdiction.
  - B. Permits: Contractor shall pay for all permits required by work under this Division.
  - C. Inspections: Contractor shall arrange for all inspections and correct non-complying installations.
- 1.03 SUBMITTALS: Refer to Division 01 for procedures.
  - A. Material and Equipment: Prior to start of work, 6 copies of a list of all materials and equipment covered by Division 26 shall be submitted for approval. Contractor shall allow ample time for checking and processing and shall assume responsibility for delays incurred due to rejected items. No installation of material concerned shall be made until such written approval has been obtained. Approval of materials and equipment shall in no way obviate compliance with the Contract Documents. Each item proposed shall be referenced to the applicable Section, Page, and Paragraph of Division 26. For each item proposed, give name of manufacturer, trade name, catalog data, and performance data.
  - B. Routing of Conduit and Piping: The drawings indicate required size and termination of conduits and raceways. It is not the intent to indicate all necessary excavation, saw cutting, coring, supports, bends, boxes, or offsets and it shall be the responsibility under this Division to install conduit in such a manner as to conform to structure, avoid obstructions, comply with the 2022 CEC, preserve headroom, keep openings and passageways clear, and make all equipment requiring inspection, maintenance and repair accessible without extra cost to the Owner.
  - C. Service Manuals: Indexed Service Manuals shall be submitted which shall include test reports, service instructions, and renewal parts lists of all equipment.
    - 1. Submission and Information: Service Manuals shall be submitted for approval at least 30 days before final inspection. The following information together with any pertinent data, shall be included in Service Manual:
      - a. Renewal part numbers of all replaceable items.
      - b. Manufacturer's cuts and rating data.
      - c. Serial numbers of all principal pieces of equipment.

- d. Supplier's name, address, and phone number.
- e. Final settings for all breakers, relays, and control devices.
- 2. Copies: Four (4) copies of approved Service Manual shall be delivered on or before date required.
- D. Record Drawings: Prepare and submit in accordance with requirements of Section 260000. Contractor shall make notations, neat and legible, daily as the work proceeds. Drawings shall be available for inspection at all times and kept at the job site. All buried conduit and/or indicated future connections outside any building shall be located both by depth and by accurate measurement from a permanently established landmark such as a building or structure.
- E. Spare Parts: Deliver following spare parts to Owner and obtain receipts. Submit at same time as Operating Instructions:
  - 1. Spare fuses; one (1) set for each combination fuse breaker.
  - 2. Spare pilot light lamps of each type used on project, in quantity of 10%, but not less than 2%.
  - 3. Overload heater elements; two (2) sets for each size used on project.
- F. Special Tools: If any part of the equipment furnished under Division 26 requires a special tool for assembly, adjustment, resetting, or maintenance thereof and such tool is not readily available on the commercial tool market, it shall be furnished with the equipment as a standard accessory and delivered to the Owner.
- G. Maintenance Paint: One (1) can of touch-up paint shall be delivered to Owner for each different color factory finish which is to be the final finished surfaces of the product.

#### 1.04 DRAWINGS:

- A. Diagrammatic Drawings: For purposes of clarity and legibility, drawings are essentially diagrammatic although size and location of equipment may be drawn to scale.
- B. Routing of Conduit and Piping: The drawings indicate required size and termination of conduits and raceways. It is not the intent to indicate all necessary excavation, saw cutting, coring, supports, bends, boxes, or offsets and it shall be the responsibility under this Division to install conduit in such a manner as to conform to structure, avoid obstructions, comply with the 2022 CEC, preserve headroom, keep openings and passageways clear, and make all equipment requiring inspection, maintenance and repair accessible without extra cost to the Owner.
- C. Coordination with Other Trades: Check with other Divisions of the Specifications so that no interference shall occur and in order that elevations may be established for the work.

Installed work which interferes with the work of other trades shall be removed and rerouted at the discretion of the Architect.

- 1.05 DAMAGE AND REPAIRS:
  - A. Emergency Repairs: Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding Contractor's warranty or relieving Contractor of his responsibility during warranty period.
  - B. Responsibility for Damage: Contractor shall be responsible for damage to grounds, buildings, or equipment due to work furnished or installed under this Division 26.
- 1.06 PROTECTION, CARE, AND CLEANING:
  - A. Protection: Provide adequate protection for finished parts of materials and equipment against physical damage from any cause during progress of work and until final completion. Sensitive electrical equipment shall not be installed until major construction is completed.
  - B. Care: During entire construction, properly cap all lines and equipment to prevent entrance of sand and dirt. Protect equipment against moisture, plaster, cement, paint or work of other trades by covering with polyethylene sheets.
  - C. Cleaning: After installation is completed, clean all systems as follows:
    - 1. Field Painted Items: Clean exterior of conduits, raceways, piping and equipment exposed in completed structure; removing all rust, plaster, cement and dirt by wire brushing. Remove grease oil and similar materials by wiping with clean rags and suitable solvents.
    - 2. Factory Finished Items: Remove grease and oil on all factory finished items such as cabinets and controllers, and leave surfaces clean and polished.
  - D. Connection: Prior to energizing, check all electrical connection hardware and torque where necessary.

### PART 2 - PRODUCTS

- 2.01 PRODUCTS: Products and materials shall be as specified in the pertinent Sections of Division 26.
- 2.02 MATERIALS AND EQUIPMENT: Wherever possible, all materials and equipment used in installation of this work shall be of same manufacturer throughout for each class of material or equipment. Materials shall be new and bear UL label, wherever subject to such approval. Comply with ANSI, IEEE and NEMA standards, where applicable.

# PART 3 - EXECUTION

- 3.01 GENERAL LATERAL BRACING REQUIREMENTS: Bracing requirements shall conform to specific requirements of the latest edition of SMACNA. Anchorages for equipment subject to thermal expansion and movement shall conform to manufacturer's recommendation and intent of general bracing requirements. When general and specific bracing requirements enumerated above are in conflict with referenced standards, the most stringent requirements shall govern.
- 3.02 EXCAVATION AND BACKFILL: Perform all excavation and back fill required to install Work of Division 26, both inside and outside. Perform all excavation and backfilling in accordance with Division 02.
  - A. Excavation: Bury conduits outside building to a depth of not less than 24" (or as required by Code) below finish grade, unless noted otherwise.
  - B. Backfilling: Do not backfill until after final inspection and approval of conduit installation by all legally constituted authorities and recording of the buried items on the Record Drawings.

### 3.03 CUTTING AND PATCHING:

- A. Cutting of Existing Structural Work: Holes in existing foundations, slabs and concrete walls shall be cored to the minimum size required. The Contractor shall submit Drawings showing dimensioned sizes and locations for all such holes to Architect for approval before cutting. Where required for conduit installation, slabs on grade shall be saw-cut to minimum required width; submit cutting Drawings to the Architect for approval before cutting.
- B. Patching: Paved or concrete surfaces, landscaping, holes or chases shall be patched to match adjacent surfaces.
- 3.04 CONCRETE WORK: Concrete construction required for the Work of Division 26 shall be provided under the Work of Division 26.
- 3.05 PAINTING: Finish painting of electrical equipment will be as specified in Division 09, unless equipment is herein specified to be furnished with factory applied finish coats. Equipment to be field painted shall be furnished with a factory applied prime coat.
  - A. Touch-Up: If factory finish on any equipment furnished under Division 26 is damaged in shipment or during construction of building, the equipment shall be refinished by Contractor to satisfaction of Architect.
  - B. Concealed Equipment: Uncoated cast-iron or steel that will be concealed, or will not be accessible when installations are completed, shall be given one heavy coat of black asphaltum before installation.
- 3.06 OPERATING INSTRUCTIONS: Contractor to provide services of an experienced Engineer to instruct Owner in operation of entire installation. Instructional period shall be during normal work day hours. This instruction period may be simultaneous with compliance tests.

- 3.07 COMPLIANCE TESTS: Conduct such tests of all portions of installation as may be necessary to ensure full compliance with the Drawings and Specifications. Tests shall be made in the presence of the Owner. Costs of test shall be borne by Contractor and Contractor shall provide all instruments, equipment, labor, temp power and materials to complete all the tests. Tests may be required on any item between installation of Work and the end of 1 year warranty period. Should these tests develop any defective materials, poor workmanship or variance with requirements of Specifications, Contractor shall make any changes necessary and remedy any defects at his expense.
  - A. All Feeders: Measure and record as follows:
    - 1. 600 volt conductors shall be tested with 500 volt megger to ground on each phase. Megger to be on test for one minute before any readings are taken. The minimum values on all feeders shall be 100,000 ohms.
    - 2. Copies of the certified test readings shall be transmitted to Owner.

# 3.08 SYSTEM ACCEPTANCE:

- A. Final Review: The Contractor shall request a final review prior to system acceptance after:
  - 1. Completion of installation of all systems required under the Contract Documents.
  - 2. Submission and acceptance of operating and maintenance data.
  - 3. Completion of identification program.
- B. Acceptance: Is contingent on:
  - 1. Completion of final review and correction of all deficiencies.
  - 2. Satisfactory completion of acceptance tests demonstrating compliance with all performance and technical requirements of Contract Documents.
  - 3. Satisfactory completion of training program and submission of manuals and Drawings required by Contract Documents.
- 3.09 PRELIMINARY OPERATION: The Owner reserves the right to operate portions of the electrical system on a preliminary basis without voiding the warranty or relieving the Contractor of his responsibilities.
- 3.10 CLEAN-UP: Upon completion and at other times during progress or Work, when required, remove all surplus materials, rubbish, and debris resulting from Work of Division 26.

# END OF SECTION 260050

# SECTION 260051 - COMMON WORK RESULTS FOR ELECTRICAL

# PART 1 - GENERAL

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

### 1.02 SUMMARY

- A. Section Includes:
  - 1. Electrical equipment coordination and installation.
  - 2. Sleeves for raceways and cables.
  - 3. Sleeve seals.
  - 4. Grout.
  - 5. Common electrical installation requirements.

### 1.03 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.
- 1.04 SUBMITTALS
  - A. Product Data: For sleeve seals.
- 1.05 COORDINATION
  - A. Coordinate arrangement, mounting, and support of electrical equipment:
    - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
    - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
    - 3. To allow right of way for piping and conduit installed at required slope.
    - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
  - B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
  - C. Coordinate sleeve selection and application per contract documents.

# PART 2 - PRODUCTS

#### 2.01 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
  - 1. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
    - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

# 2.02 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Manufacturers: Subject to compliance with requirements:
  - 2. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
    - d. Pipeline Seal and Insulator, Inc.
  - Sealing Elements: EPDM NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 4. Pressure Plates: Include two for each sealing element.
  - 5. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.
- 2.03 GROUT
  - A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

# PART 3 - EXECUTION

### 3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- D. Right of Way: Give to piping systems installed at a required slope.

#### 3.02 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
  - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements of contract documents.

- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with Firestop materials. Comply with requirements in contract documents.
- K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- L. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

# 3.03 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- 3.04 FIRESTOPPING
  - A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in contract documents.

END OF SECTION 260051

# SECTION 260060 - MINOR ELECTRICAL DEMOLITION FOR REMODELING

- PART 1 GENERAL
- 1.01 SECTION INCLUDES
  - A. Electrical demolition.

#### PART 2 - PRODUCTS

#### 2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.
- PART 3 EXECUTION
- 3.01 EXAMINATION
  - A. Verify field measurements and circuiting arrangements are as shown on Drawings.
  - B. Verify that abandoned wiring and equipment serve only abandoned facilities.
  - C. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Owner and Architect/Engineer before disturbing existing installation.
  - D. Beginning of demolition means installer accepts existing conditions.

# 3.02 PREPARATION

- A. Disconnect and make safe all electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Utility Company and Owner's representative.
- C. Provide temporary generators, wiring and connections to maintain required existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area when outage affects business operation.

- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner and local fire service at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Clocks/Bells/PA/Data Communication System: Maintain existing system in service until new system is complete and ready for service and new system is accepted. Disable system only to make switchovers and connections. Notify Owner and Telephone Utility Company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- G. Existing Security System: Maintain existing system in service until new system is complete and ready for service and new system is accepted. Disable system only to make switchovers and connections. Obtain permission from the Owner and security company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

# 3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring, including low voltage, to source of supply and re-label devices as spares.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Disconnect and remove abandoned conduit.

- J. Repair adjacent construction and finishes damaged during demolition and extension work.
- K. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- L. Intercept, reroute, and extend existing installations using materials and methods compatible with existing electrical installations, and in compliance with new project specifications.
- M. Modify existing as-built drawings to note changes.

### 3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and retorque all electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

# 3.05 INSTALLATION

A. Install relocated materials and as required by this section and Owner's representative.

# END OF SECTION 260060

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# SECTION 260061 - GROUNDING AND BONDING

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.
- 1.03 QUALITY ASSURANCE
  - A. 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.
  - B. Comply with UL 467 for grounding and bonding materials and equipment.

#### PART 2 - PRODUCTS

- 2.01 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. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
    - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
    - 5. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

#### 2.02 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

### PART 3 - EXECUTION

### 3.01 APPLICATIONS

A. Conductors: Install solid conductor for No. 12 AWG and smaller, and stranded conductors for No. 10 AWG and larger, unless otherwise indicated.

# 3.02 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. Branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
- C. 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.

### 3.03 INSTALLATION

- A. 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.

### 3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Report measured ground resistances that exceed the following values:
  - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260061

# SECTION 260075 - ELECTRICAL IDENTIFICATION

### 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 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. 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.
- D. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
  - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

### 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.

- C. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

# 2.3 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches 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.
- D. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
  - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

### 2.4 FLOOR MARKING TAPE

A. 2-inch wide, 5-mil 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.
- 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. Baked-Enamel Warning Signs:
    - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
    - 2. 1/4-inch grommets in corners for mounting.
    - 3. Nominal size, 7 by 10 inches.
  - D. Metal-Backed, Butyrate Warning Signs:
    - 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
    - 2. 1/4-inch grommets in corners for mounting.
    - 3. Nominal size, 10 by 14 inches.
  - E. 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."
- 2.7 INSTRUCTION SIGNS
  - A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch 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. Overlay shall provide a weatherproof and UV-resistant seal for label.

# 2.8 EQUIPMENT IDENTIFICATION LABELS

- A. 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. Overlay shall provide a weatherproof and UV-resistant seal for label.
- B. 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.

# 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.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 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.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
  - 3. UL 94 Flame Rating: 94V-0.
  - 4. Temperature Range: Minus 50 to plus 284 deg F.
  - 5. Color: Black.

### 2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in Division 09 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 maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- G. 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.
- H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
- I. Painted Identification: Comply with requirements in Division 09 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 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 30-foot 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.
- 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 service 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 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. Power-Circuit Conductor Identification, More than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use write-on tags.
- E. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- F. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- G. 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.
- H. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

- 1. Limit use of underground-line warning tape to direct-buried cables.
- 2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- I. 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.
- J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel 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.
- K. 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.
- L. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer load shedding.
- M. 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- high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches 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. Emergency system boxes and enclosures.
  - f. Remote-controlled switches, dimmer modules, and control devices.
  - g. Monitoring and control equipment.
  - h. Fire alarm equipment.

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# **SECTION 260111 - CONDUITS**

#### PART 1 - GENERAL

A. The general provisions of Section 011000 apply to this section.

# 1.01 WORK INCLUDED

- A. Conduits; including:
  - 1. Rigid steel conduit.
  - 2. Intermediate metal conduit (IMC).
  - 3. Electrical metallic tubing (EMT).
  - 4. Rigid aluminum conduit.
  - 5. Polyvinyl chloride conduit (PVC).
  - 6. Flexible metal conduit.
  - 7. Liquid-tight flexible metal conduit.

#### 1.02 DEFINITION

- A. Conduit: This term shall be construed to mean conduit and conduit fittings; and tubing and tubing fittings.
- 1.03 RELATED WORK SPECIFIED ELSEWHERE
  - A. Support material: Section 260190.

# PART 2 - PRODUCTS

- 2.01 MATERIAL AND FABRICATION ALL MATERIALS SHALL BE MANUFACTURED IN THE USA.
  - A. Rigid Steel Conduit: Hot-dipped galvanized or sherardized including the threads, manufactured in accordance with ANSI C80.1 and UL6.
    - 1. Threaded, hot-dipped galvanized or sherardized fittings manufactured in accordance with ANSI C80.4.
  - B. Intermediate Metal Conduit: Hot-dipped galvanized including the threads, manufactured in accordance with UL 1242.

- C. Electrical Metallic Tubing: Manufactured in accordance with ANSI C80.3 and UL 797.
  - 1. Provide compression fittings in walls, ceiling spaces or exposed construction areas.
  - 2. Provide compression (water tight) fittings in damp areas or areas exposed to weather.
- D. Rigid Aluminum Conduit: Manufactured in accordance with ANSI C80.5.
  - 1. Threaded fittings, manufactured in accordance with ANSI C80.4.
- E. Polyvinyl Chloride Conduit: Schedule 40 and schedule 80, manufactured in accordance with ANSI C33.91, UL 651, and NEMA TC-2.
  - 1. Cemented type fittings of the same manufacturer as the conduit.
- F. Polyvinyl Chloride Conduit: Type EB, heavy wall, manufactured in accordance with ANSI C33.91, UL651, and NEMA TC-8.
  - 1. Cemented fittings of the same manufacturer as the conduit.
- G. Flexible Metal Conduit: Hot-dipped galvanized steel, manufacturer in accordance with UL 1.
  - 1. Squeeze type, malleable iron, cadmium plated, straight and angle connectors for all sizes and twist-in connectors for  $\frac{1}{2}$  and  $\frac{3}{4}$  flexible metal conduit.
- H. Liquid-Tight Flexible Conduit: Hot-dipped galvanized with liquid-tight vinyl jacket.
  - 1. Liquid-tight fittings.

# PART 3 - EXECUTION

- 3.01 USE
  - A. EMT for all exposed and concealed work except as indicated in Paragraphs B, C, D, E, F, and G.
  - B. Rigid steel conduit in areas where exposed and below 10'-0".
  - C. Rigid aluminum conduit may be used for all feeder runs exposed or concealed in stud walls and spaces above suspended ceilings.
  - D. PVC Conduit:
    - 1. Schedule 40 for runs below grade in direct contact with earth.

- 2. Schedule 40 in concrete floors, walls or roofs.
- E. Flexible Conduit (steel only permitted):
  - 1. For connection to equipment subject to vibration, maximum length 18". In wet locations use liquid-tight flexible conduit.
  - 2. For connection to lighting fixtures above suspended ceilings. Lengths limited to 72".
  - 3. Install ground conductors in all flexible conduits.
- F. Where <sup>3</sup>/<sub>4</sub>" conduit runs are concealed in walls or ceilings and these runs are through wood studs and wood joists, flexible steel conduit may be used up to a maximum length of 6'-0".
- G. All risers 5'-0" and below shall be PVC coated RGS with bushings.
- H. In concrete or below grade use conduit not smaller than 1". Maximum size in concrete slab: 1". Run larger sizes under slab.
- I. Use long sweep elbows with minimum radius 10 times nominal conduit diameter for all telephone runs.

# 3.02 INSTALLATION

- A. Provide conduit support and bracing in accordance with the latest published SMACNA guidelines.
- B. Perform excavating, trenching, backfilling, and compacting as specified in Division 02.
- Minimum cover for runs below finished grade outside buildings: 24" except where noted or required by the serving utility. Minimum cover for conduit in concrete floors, walls or roof: 1/3 thickness of slab. Minimum cover under building slabs is 12".
- D. Minimum separation from uninsulated hot water pipes, steam pipes, heater flues or vents:
  6". Avoid running conduit directly under water lines.
- E. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose.
- F. Provide conduit bodies for exposed conduit runs at junctions, bends or offsets where required. Do not use elbows or bends around outside corners of beams, walls or equipment. Make conduit body covers accessible.
- G. Make conduit field cuts square with saw and ream out to full size. Shoulder conduits in couplings.

- H. Run a minimum of one  $\frac{3}{4}$ " empty conduit for every three single pole spare circuit breakers, spaces or fraction thereof and not less than two  $\frac{3}{4}$ " conduits from every flush mounted panel to an accessible space above the ceiling and below the floor.
- I. Make conduit projections from covered areas to areas exposed to the weather watertight by proper flashing. Extend flashing a minimum of 6 inches in all directions from conduit.
- J. Where conduit is to remain empty, install polypropylene or nylon pull-line 3/16" minimum diameter from end to end with tag at each end designating opposite terminations.
- K. Run conduit parallel and at right angle to building lines, painted to match supporting surface, when visible in finished construction.
- L. Cap conduits indicated to be stubbed-out underground using glued-on PVC caps intended for this purpose.
- M. Install a coupling flush with the floor on all conduits stubbed up through floors on grade.
- N. Make no bends with a radius less than 12 times the diameter of the cable it contains nor more than 90 degrees. Make field bends with tools designed for conduit bending. Heating of metallic conduit to facilitate bending is not permitted.
- O. Where conduit installed in concrete or masonry extends across building construction joints, provide expansion fittings as manufactured by O.Z.; Crouse-Hinds; Appleton; or equal, with approved ground straps and clamps.
- P. Concrete Wall or Slab Penetrations: All core drilling, sleeves, blockouts or other penetrations must be x-rayed, report provided, and approved by the Structural Engineer prior to installation.
  - 1. Space sleeves and core drills to insure a minimum dimension of 3 times the nominal trade diameter of the largest adjacent conduit between sleeves or core drills.
  - 2. Use blockouts for concentrations of conduits in a confined area.
- Q. Do not penetrate walls with flexible conduit where subject to physical damage. Use recessed box with extension ring for transition from interior to exterior of wall.
- R. All homeruns shown shall be run to the panel indicated independently of all other homeruns. Provide pull points so as not to exceed total bends of 360 degrees between them unless otherwise indicated.
- S. At switchboards, manholes and floor standing distribution panelboards, provide insulated throat bushings or bell ends on all non-metallic conduit entries and bushings on all metallic conduit entries.

- T. Provide bushings on all conduit terminations sized 1" and larger.
- U. Provide weatherproof boxes and connectors for all exposed raceways and boxes.
- V. Provide bell ends on all stubbed up conduits, seal all conduits after conductors are pulled.
- W. Cap all unused conduits with end cap. Do not tape.

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# **SECTION 260115 - WIREWAYS**

#### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

A. Wireways, sheet metal troughs with screw-on removable covers.

#### PART 2 - PRODUCTS

#### 2.01 ACCEPTABLE MANUFACTURERS

- A. Hoffman Engineering Co.
- B. General Electric Co.
- C. Square D Co.
- 2.02 MATERIAL AND FABRICATION
  - A. Use sheet steel wireways with screw-on covers and corrosion resistant hardware. For dry locations coat with rust inhibitor and finish with gray baked enamel. For wet locations use hot-dipped galvanized material finished with gray baked enamel, provide gaskets for covers as required. Provide (permanent engraved (3/4" letters) labels on all covers to signify voltage, communications or telephone.

#### PART 3 - EXECUTION

#### 3.01 INSTALLATION

A. Wireways shall be securely fastened to the mounting surface. Use expansion type anchors in concrete. Suspended wireways shall be supported 4 feet on centers.

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# SECTION 260118 - DUCT BANK

#### PART 1 - GENERAL

- 1.01 SECTION INCLUDES
  - A. Metal conduit.
  - B. Duct.
  - C. Manholes.
- 1.02 RELATED SECTIONS
  - A. Section 033000 Cast-In-Place Concrete.

#### 1.03 REFERENCES

- A. Quality Control: Requirements for references and standards.
- B. ANSI C80.1 Rigid Steel Conduit, Zinc-Coated.
- C. ASTM A48 Gray Iron Castings.
- D. ASTM C857 Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
- E. ASTM C858 Underground Precast Concrete Utility Structures.
- F. ASTM C891 Installation of Underground Precast Utility Structures.
- G. ASTM C1037 Inspection of Underground Precast Utility Structures.
- H. IEEE C2 National Electrical Safety Code.
- I. NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- J. NEMA TC 2 Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
- K. NEMA TC 3 PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- L. NEMA TC 6 PVC and ABS Plastic Utilities Duct for Underground Installation.
- M. NEMA TC 9 Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.

- N. NEMA TC 10 PVC and ABS Plastic Communications Duct and Fittings for Underground Installation.
- O. NEMA TC 14 Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings.
- P. NFPA 70 National Electrical Code.
- Q. UL 651A Type EB and A PVC Conduit and HDPE Conduit.
- 1.04 SUBMITTALS FOR REVIEW
  - A. Section 260000 Submittals: Procedures for submittals.
  - B. Product Data: Provide for metallic conduit or nonmetallic conduit, all manhole accessories, fittings and supports.
  - C. Shop Drawings: Indicate dimensions, reinforcement, size and locations of openings, and accessory locations for precast manholes.
- 1.05 SUBMITTALS FOR INFORMATION
  - A. Section 260000 Submittals: Submittals for information.
  - B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.
- 1.06 SUBMITTALS FOR CLOSEOUT
  - A. Project Record Documents: Record actual routing and elevations of underground conduit and duct, and locations and sizes of manholes.
- 1.07 QUALIFICATIONS
  - A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience, and with service facilities within 100 miles of Project.
- 1.08 REGULATORY REQUIREMENTS
  - A. Conform to requirements of NFPA 70 and IEEE C2.

- B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.
- 1.09 FIELD MEASUREMENTS
  - A. Verify that field measurements are as indicated.
  - B. Verify routing and termination locations of duct bank prior to excavation for rough-in.
  - C. Verify locations of pull boxes prior to excavating for installation.
  - D. Duct bank routing is shown in approximate locations unless dimensions are indicated. Route as required to complete duct system.

#### PART 2 - PRODUCTS

- 2.01 RIGID STEEL CONDUIT
  - A. Rigid Steel Conduit: ANSI C80.1.
  - B. Fittings: NEMA FB 1, steel.
- 2.02 PLASTIC CONDUIT
  - A. Rigid Plastic Conduit: NEMA TC 2, Schedule 40 and 80 PVC, with fittings and conduit bodies to NEMA TC 3.
  - B. Rigid Plastic Underground Conduit: UL 651A, Type A PVC, High-density polyethylene, Schedule 40.
- 2.03 PLASTIC DUCT
  - A. Plastic Utilities Duct: NEMA TC 6; ABS Type DB.
  - B. Plastic Utility Duct Fittings: NEMA TC 9.
  - C. Plastic Communications Duct and Fittings: NEMA TC 10, Type DB.

#### 2.04 PRECAST CONCRETE PULLBOXES

- A. Description: Precast pull box designed in accordance with ASTM C858, comprising modular, interlocking sections complete with accessories.
- B. Loading: ASTM C857, Class A-16, A-12, A-8 or A-0.3 as required.

- C. Shape: Square or Rectangular with truncated corners and as indicated.
- D. Riser Casting: 12", with cable supports cast into frame.
- E. Frames and Covers: ASTM A48; Class 30B gray cast iron, 30" size, machine finished with flat bearing surfaces. Provide cover marked ELECTRIC or TELEPHONE as appropriate.
- F. Duct Entry Provisions: Window knockouts.
- G. Duct Entry Locations: As indicated.
- H. Duct Entry Size: As indicated.
- I. Cable Pulling Irons: Use galvanized rod and hardware. Locate opposite each duct entry. Provide watertight seal.
- J. Cable Rack Inserts: Minimum load rating of 800 pounds (365 kg). Locate at 3 feet on center.
- K. Cable Rack Mounting Channel:  $1-1/2 \times \frac{3}{4}$ " steel channel, 48" length. Provide cable rack arm mounting slots on 1-1/2 inch centers.
- L. Cable Racks: Steel channel, 1-1/2 x 3/4 x 14", with fastener to match mounting channel.
- M. Cable Supports: Porcelain clamps and saddles.
- N. Sump Covers: ASTM A48; Class 30B gray cast iron.
- O. Source Quality Control: Inspect in accordance with ASTM C1037.

# 2.05 ACCESSORIES

A. Underground Warning Tape: 4" wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

# PART 3 - EXECUTION

- 3.01 DUCT BANK INSTALLATION
  - A. Quality Control: Manufacturer's instructions.
  - B. Install duct to locate top of duct bank at depths as indicated on drawings.
  - C. Install duct with minimum slope of 4" per 100 feet. Slope duct away from building entrances.

- D. Cut duct square using saw or pipe cutter; de-burr cut ends.
- E. Insert duct to shoulder of fittings; fasten securely.
- F. Join nonmetallic duct using adhesive as recommended by manufacturer.
- G. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- H. Install no more than equivalent of three 90-degree bends between pull points.
- I. Provide suitable fittings to accommodate expansion and deflection where required.
- J. Terminate duct at pull box entries using end bell.
- K. Stagger duct joints vertically in concrete encasement 6" minimum.
- L. Use suitable separators and chairs installed not greater than 4 feet on centers.
- M. Band ducts together with standard commercial racking before backfilling with sand slurry.
- N. Securely anchor duct to prevent movement during concrete placement.
- O. Place concrete under provisions of Section 033000. Use mineral pigment to color concrete red.
- P. Provide minimum 3" concrete cover at bottom, top, and sides of duct bank.
- Q. Provide two No. 4 steel reinforcing bars in top of bank under paved areas.
- R. Connect to existing concrete encasement using dowels.
- S. Connect to pull box wall using dowels.
- T. Provide suitable pull string in each empty duct except sleeves and nipples.
- U. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.
- V. Backfill trenches.
- W. Interface installation of underground warning tape with backfilling. Install tape 6 inches below finished surface.

# 3.02 PRE-CAST MANHOLE INSTALLATION

- A. Quality Control: Manufacturer's instructions.
- B. Excavate for pull box installation.
- C. Install and seal precast sections in accordance with ASTM C891.
- D. Install pull boxes plumb.
- E. Use precast neck and shaft sections to bring pull box cover to finished elevation.
- F. Attach cable racks to inserts after pull box installation is complete.
- G. Install drains in manholes and connect to site drainage system or if approved by engineer to 4 inch (DN100) pipe terminating in 1 cu yd crushed gravel bed.
- H. Damp-proof exterior surfaces, joints, and interruptions of pull boxes after concrete has cured 28 days.
- I. Backfill pull box excavation.

# SECTION 260120 - CONDUCTORS AND CABLES

#### PART 1 - GENERAL

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

#### 1.02 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.
  - 3. Sleeves and sleeve seals for cables.

#### 1.03 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

#### 1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports.

#### 1.05 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.

#### 1.06 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

### PART 2 - PRODUCTS

- 2.01 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 THHN-THWN.

#### 2.02 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.

#### 2.03 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in contract documents.

# 2.04 SLEEVE SEALS

- 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:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. Calpico, Inc.
  - 3. Metraflex Co.
  - 4. Pipeline Seal and Insulator, Inc.
- D. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
  - 1. Sealing Elements: EPDM, NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 2. Pressure Plates: Include two for each sealing element.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

# PART 3 - EXECUTION

- 3.01 CONDUCTOR MATERIAL APPLICATIONS
  - A. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- 3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- B. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- C. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- D. Class 2 Control Circuits: Type THHN-THWN, in raceway.

# 3.03 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. Identify and color-code conductors according to Division 26 Section "Tests and Identification."

#### 3.04 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torquetightening 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.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

# 3.05 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in contract documents.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:

- 1. For sleeve rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
- 2. For sleeve rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both wall surfaces.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to contract documents.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to contract documents.
- L. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

# 3.06 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground exterior-wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

# 3.07 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to contract documents.

# **SECTION 260130 - ELECTRICAL BOXES**

#### PART 1 - GENERAL

- 1.01 WORK INCLUDED
  - A. Boxes; including:
    - 1. Outlet boxes.
    - 2. Pull and junction boxes.
    - 3. Cabinets.

#### 1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittals: Section 260000.
- B. Support Material: Section 260190.

# PART 2 - PRODUCTS

- 2.01 MATERIAL AND FABRICATION
  - A. Outlet Boxes:
    - 1. Pressed Steel Boxes: Knockout type, hot-dipped or electro-plate galvanized.
    - 2. Cast Iron Boxes: Hot-dipped or electro-plate galvanized with threaded hubs.
    - 3. Cast Iron Conduit Bodies: Hot-dipped or electro-plate galvanized with threaded hubs.
    - 4. Cast copper free aluminum conduit bodies with threaded hubs.
    - 5. Covers for Pressed Steel Boxes: Hot dipped or electro-plate galvanized.
    - 6. Outlet boxes manufactured in accordance with UL 514.
  - B. Pull and Junction Boxes:
    - 1. Sheet steel, hot-dipped or electro-plate galvanized, or prime coated and a final coat of manufacturer's standard enamel or lacquer finish. Manufactured in accordance with UL 50.

- a. Where exposed to weather, provide type FS box and raintight hubs for conduits entering the boxes, top and sides only.
- 2. Precast Concrete Pull Boxes: As manufactured by Jensen Pre-Cast, Utility Vault or New Basis and size shown on drawings.
- C. Cabinets: As noted on plans, and sheet metal, prime coat and final coat of manufacturer's standard enamel or lacquer finish. Manufactured in accordance with UL 50.
  - 1. Control Cabinet: NEMA 1 enclosure, door with butt hinges and flush handle latches.
    - a. Provide with removable steel back panel.
  - 2. Terminal Cabinets: NEMA 1 enclosure, door with concealed hinges and spring catch type flush cylinder locks. Key locks alike, provide two keys with each lock.
  - 3. Provide engraved plastic nameplates with 1/2" minimum height letters indicating designation of control and terminal cabinets as shown on the drawings.
    - a. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation are not acceptable.

# PART 3 - EXECUTION

- 3.01 USE
  - A. Outlet Boxes:
    - 1. Ceiling Outlet Boxes: Not less than 4" octagonal by 2" deep.
    - 2. FDD cast iron or cast aluminum device boxes and conduit bodies with metal covers for exposed conduit installation. Provide gasket for covers in wet areas.
    - 3. Intercom, Voice/Data Outlet Boxes: Not less than 4-11/16" square x 2-1/8" deep.
  - B. Pull and Junction Boxes:
    - 1. Use sheet steel boxes NEMA Type 1 for indoor and NEMA Type 3R for outdoor installation, except as follows.
    - 2. Use precast concrete boxes H20 traffic rated for boxes flush in finish grade where requiring a nominal capacity greater than 144 cubic inches, where located in vehicular traffic areas, or where indicated.
    - 3. Use cast iron boxes for boxes flush in slab on grade.

#### 3.02 INSTALLATION

LOMPOC UNIFIED SCHOOL DISTRICT MIGUELITO PORTABLES

- A. Provide 3/8" fixture studs in wall bracket and ceiling boxes.
- B. Provide covers suitable for the fixtures or devices used.
- C. Make outlet box covers flush with finished surfaces.
- D. Close unused open knockouts with knockout seals.
- E. Provide 1" deep plaster rings on recessed outlet boxes installed in areas where concrete will be exposed after construction is complete.
- F. Where boxes are concealed in exposed concrete unit masonry, use square cornered types or boxes fitted with rings of sufficient depth for the box to be recessed completely within cavity of block or tile. Install box to insure that ring fits an opening sawed out of the masonry, so that no mortar is required to fill between ring and construction.
- G. Provide a 6" base of compacted crushed rock under precast concrete pull boxes.
- H. All precast concrete pull boxes shall be provided with a bottom section.
- I. Adjust floor boxes so they are level with top of finished floors.
- J. Provide pull boxes and junction boxes in all branch circuit and feeder runs as indicated. Do not provide pull boxes unless they are indicated or required by the Electrical Code.

#### 3.03 IDENTIFICATION

A. Junction Boxes: Use permanent black marker, 2" high lettering, and on each cover plate indicate the power source and circuits contained within that junction box.

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# **SECTION 260142 - NAMEPLATES AND WARNING SIGNS**

#### PART 2 - PRODUCTS

- 2.01 Nameplate shall be plastic laminate with 3/4" high letters in white on black background screwed onto equipment designations shall clearly state:
  - A. Equipment Enclosure Nameplates.
    - 1. Manufacturer's nameplate including equipment design rating of current, voltage, KVA, HP, bus bracing rating, or as applicable.
    - 2. Equipment nameplate designating system usage and purpose, system nominal voltage, equipment rating for KVA, amperes, HP and RPM as applicable. Designation data per drawings or to be supplied with shop drawings approval.
  - B. Device nameplates: Device usage, purpose, or circuit number; manufacturer and electrical characteristic ratings including the following:
    - 1. Circuit Breakers: Voltage, continuous current, maximum interrupting current and trip current.
    - 2. Switches: Voltage, continuous current, horsepower or maximum current switching. If fused, include nameplate stating "Fuses must be replaced with current limiting type of identical characteristics."
    - 3. Contactors: Voltage, continuous current, horsepower or interrupting current, and whether "mechanically-held" or "electrically-held".
    - 4. Motors: Rated voltage, full load amperes, frequency, phases, speed, horsepower, code letter rating, time rating, type of winding, class and temperature.
    - 5. Controllers: Voltage, current, horsepower and trip setting of motor running over current protection.
- 2.02 Warning signs shall be minimum 18 gauge steel, white porcelain enamel finish with red lettering. Lettering to read "DANGER - HIGH VOLTAGE" in 1" letters. Warning signs to be included on door or immediately above door of all electrical equipment rooms, vaults or closets containing equipment rooms, vaults or closets containing equipment energized above 150 volts to ground, except where such spaces are accessible from public areas.
- 2.03 Warning designation in 1" red letters shall be painted by stencil or pre-printed adhesive on each pull box, cabinet or 1-foot length of exposed conduit stating "DANGER" and giving voltage of enclosed conductors such as "DANGER 480 VOLTS", for all systems over 150 volts to ground.

PART 3 - EXECUTION

- 3.01 Nameplates shall be mounted by self-tapping or threaded screws and bolts or by rivets.
- 3.02 Signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.

# **SECTION 260190 - SUPPORT DEVICES**

- PART 1 GENERAL
- 1.01 WORK INCLUDED
  - A. Support devices for conduit, boxes, lighting fixtures and equipment.

#### PART 2 - PRODUCTS

# 2.01 ACCEPTABLE MANUFACTURERS

- A. Hangers, Straps and Beam Clamps:
  - 1. Efcor.
  - 2. Raco, Inc.
  - 3. Steel City.
  - 4. O.Z./Gedney Co.
  - 5. Caddy Fastening System by ERICO Products Inc.
- B. Channels and Fittings:
  - 1. Kindorf.
  - 2. Unistrut Corp.
- C. Anchors:
  - 1. Acherman-Johnson Corp.
  - 2. Phillips Drill Co.
  - 3. Rawl Products Co.

# 2.02 MATERIAL AND FABRICATION

- A. Hangers: Steel cadmium plated.
- B. Straps: One-hole and two-hole malleable iron, hot-dipped galvanized or steel, cadmium or zinc plated.

- C. Beam Clamps: Malleable iron, hot-dipped galvanized or cadmium plated.
- D. Channels and Fittings:
  - 1. Channels: Hot-dipped galvanized.
  - 2. Fittings: Galvanized.
- E. Anchors: Self drilling and expansion bolt types. No wood or fiber plugs or concrete nails are acceptable.

# PART 3 - EXECUTION

- 3.01 USE
  - A. Use two-hole straps for <sup>3</sup>/<sub>4</sub>" conduit and smaller single conduit runs on walls or ceilings.
  - B. Use hangers with solid steel rods for hanging single conduits above <sup>3</sup>/<sub>4</sub>".
  - C. Use formed channel trapezes for groups of two or more conduits.
  - D. To fasten boxes and supports to:
    - 1. Wood: Use wood screws or screw type nails of equal holding power.
    - 2. Brick and Concrete: Use bolts and expansion shields.
    - 3. Hollow Masonry Units: Use toggle bolts.
  - E. Support sheet metal boxes from building structure directly or by bar hangers.
  - F. Do not penetrate reinforced concrete beams with fastenings more than 1-1/2" or reinforced concrete joints with more than <sup>3</sup>/<sub>4</sub>" fastenings to prevent contact with reinforcing steel.

# SECTION 260720 - FIRE ALARM DETECTION SYSTEMS

#### PART 1 - GENERAL

#### 1.01 SCOPE

Contractor shall provide a Silent Knight (District standard no substitutions) fully automatic fire alarm system for portable classroom project area including reprogramming and reconfiguration of an existing campus Silent Knight digital protocol addressable fire alarm system. This system shall include, but not be limited to, system cabinet, power supply, built in Signaling Line Circuit (SLC), 80 character LCD annunciator, built in dual line Digital Communicator associated peripheral devices, batteries, wiring, conduit and other relevant components and accessories required to furnish a complete and operational Life Safety System.

# 1.02 SECTION INCLUDES

- A. Fire alarm and detection: Low voltage DC solid state modular, fully addressable, supervised non-coded system, complete with:
  - 1. Control panel.
  - 2. Stand-by emergency power supply.
  - 3. Smoke detectors and other initiating devices.
  - 4. Accessory relays.
  - 5. Alarm signaling and speaker devices.
  - 6. Air handling equipment shutdown.

#### 1.03 GENERAL REQUIREMENTS

The fire alarm equipment and installation shall comply with the current provisions of the following standards and shall be listed for it's intended purpose and be compatibility listed to insure integrity of the complete system.

- A. California Electrical Code NFPA 70 National Electrical Code with State of California amendments.
- B. NFPA 72: National Fire Alarm Code.
- C. California Fire Code (CFC) International Fire Code with State of California amendments.
- D. California Building Code (CBC) International Building Code with State of California amendments.

- E. Installation shall conform to the current edition of the National Fire Protective Association Standards 72, State of California and County of Santa Barbara.
- F. Acceptance of the system by California State Fire Marshal, DSA, County of Santa Barbara, and Owner.
- 1.3.1 NATIONAL ELECTRIC CODE, NFPA 70 ARTICLE 760
- 1.3.2 NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS:

NFPA 15	Water Spray Fixed Systems
NFPA 16	Deluge Foam Water Systems
NFPA 72	National Fire Alarm Code

- 1.3.3 LOCAL AND STATE BUILDING CODES
- 1.3.4 LOCAL AUTHORITIES HAVING JURISDICTION

State of California Division of the State Architect

1.3.5 UNDERWRITERS LABORATORIES INC.

> All equipment shall be approved by Underwriters Laboratories, Inc. for its intended purpose, listed as power limited by Underwriters Laboratories, Inc., for the following standards as applicable:

UL 864 UOJZ Control units for Fire Protective Signaling Systems

Local Signaling Unit
Central Station Signaling Protected Premises Unit
Remote Signaling Protected Premises Unit
Smoke Detectors for Fire Protective Signaling systems
Smoke Detectors for duct applications
Smoke Detectors for Single Stations
Heat Detectors for Fire Protective signaling systems
Door Holders for Fire Protective signaling systems
Audible signaling appliances
Visual signaling appliances
Manually Activated Signaling Boxes
Waterflow indicators for Fire Protective signaling systems
Power Supplies for Fire Protective Signaling systems.

#### 1.3.6 AMERICANS WITH DISABILITIES ACT (ADA)

All visual Notification appliances, speakers, and manual pull stations shall comply with the requirements of the Americans with Disabilities Act.

#### 1.3.7 SUBMITTALS

The contractor shall submit six complete sets of shop drawings and documentation within 15 calendar days after award of the contract. Indicated in the document will be the type, size, rating, style, catalog number, manufacturers' names, photos, and /or catalog data sheets for all items proposed to meet these specifications. The proposed equipment shall be subject to the approval of the Architect/Engineer and no equipment shall be ordered or installed on the premises without that approval.

NOTE: DOCUMENTATION - Submittal of shop drawings for entire fire alarm system, calculations, device locations, etc. and shall contain at least six copies of the manufacturer specification and installation instruction sheets. All equipment and devices on the shop drawings to be furnished under this contract shall be clearly marked in the specification sheets and on the shop drawings.

Supplier's qualifications shall be submitted indicating years in business, service policies, warranty definitions, NICET Level II certification, C7 and C10 California licensed contractor, completion of factory training program and a list of similar installations. The supplier shall be an Engineered Systems Distributor for Silent Knight products and prove of such relationship with the manufacture must be shown. The supplier must maintain a service department with spare parts of each item listed within 100 miles of the project.

Contractor qualifications shall be supplied indicating years in business and prior experience with installations that include the type of equipment that is to be supplied.

The contractor shall provide hourly Service Rates, performed by a factory-trained technician for this installed Life Safety System with the submittal. Proof of training and authorization shall be included with the submittal. These hourly service rates shall be guaranteed for a 1-year period.

# 1.3.8 CONTRACT CLOSE-OUT SUBMITTALS

Deliver two copies of the following to the Owner's representative within Thirty days of system acceptance. The closeout submittals shall include:

Installation and Programming manuals for the installed Life Safety System.

Point to point diagrams of the entire Life Safety System as installed. This shall include all connected Smoke Detectors and addressable field modules.

All drawings must reflect device address as verified in the presence of the engineer and/or end user.

# 1.3.9 WARRANTY

Warranty all materials, installation and workmanship for a one year period, after final acceptance test approval. A copy of the manufacturer's warranty shall be provided with the closeout documentation.

# 1.3.10 PRODUCTS

This Life Safety System Specification must be conformed to in its entirety to ensure that the installed and programmed Life Safety System will accommodate all of the requirements and operations required by the building owner. Any specified item or operational feature not specifically addressed prior to the bid date will be required to be met without exception.

Submission of product purported to be equal to those specified herein will be considered as possible substitutes only when all of the following requirements have been met:

- 1. Any deviation from the equipment, operations, methods, design or other criteria specified herein must be submitted in detail to the specifying Architect or Engineer a minimum of ten working days prior to the scheduled submission of bids. Each deviation from the operation detailed in these specifications must be documented in detail, including page number and section number, which lists the system function for which the substitution is being proposed.
- A complete list of such substituted products with six copies of working drawings thereof shall be submitted to the approved Architect and/or Consulting Engineer not less than ten working days prior to the scheduled submission of bids.

# 1.3.11 GENERAL EQUIPMENT AND MATERIALS REQUIREMENTS

All equipment furnished for this project shall be new and unused. All components shall be designed for uninterrupted duty. All equipment, materials, accessories, devices and other facilities covered by this specification or noted on the contract drawings and installation specification shall be best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this specification is provided by different manufacturers, then that equipment shall be "Listed" as to its compatibility by Underwriters Laboratories (UL), if such compatibility is required by UL standards.

# 1.04 RELATED WORK SPECIFIED ELSEWHERE

A. Conduits: Section 260111.
### 1.05 SUBMITTALS

- A. Procedures: In accord with Section 260000.
- B. Submit detailed shop drawings, to include point-to-point wiring diagrams, calculations, device locations for fire alarm panel and all field devices showing each wire required in system.
  - 1. Shop drawings shall be provided using AutoCAD format. Floor plan background will be available from architect.
- C. Submission dates for preliminary documentation shall be in accord with the time schedule provided to Contractor.
- D. Submittal shall be comprised of six sets. Submit three sets to the authority having jurisdiction for their approval and three sets shall be submitted for Owner's review. The following items shall be included in submittal:
  - 1. Catalog sheets on all items proposed for system.
  - 2. Installation instructions.
  - 3. Connection diagrams including point to point wiring diagrams.
  - 4. Commissioning instructions.
  - 5. Operating instructions.
  - 6. Detailed maintenance and troubleshooting instructions.
  - 7. Battery calculations showing proper back-up battery sizing.
  - 8. Photocopy of current State C-10 Contractor's License.
  - 9. Other items as required by the authority having jurisdiction.
- E. Provide three copies of revised and final version of the above system documentation at time of Certificate of Occupancy testing. Documentation to include properly executed NFPA 72 "Fire Alarm System Certification and Description" form, executed by Contractor's qualifying agent who obtained permit for construction and smoke detector sensitivity report.

#### 1.06 QUALITY ASSURANCE

- A. Contractor shall furnish, install, and commission a complete automatic fire alarm system in accord with Contract Drawings and Specifications.
- B. Provide a system in accord with plans, electrically supervised, connected, tested, and left in perfect operating condition.
- C. Provide automatic fire alarm controls, alarm actuation devices and alarm signaling devices at locations indicated on Contract Drawings.
- D. All items of this Specification not fully met by manufacturer's proposal shall be indicated with reference to relevant paragraph of the Specifications.
- E. Installation contractor shall be able to demonstrate availability of an experienced staff for planning, engineering, installing, commissioning, training, and maintaining automatic fire alarm system.
- F. Regulatory requirements:
  - 1. All equipment proposed and planned for use shall be formally approved and/or listed under California State Fire Marshal and at least one of the following:
    - a. Underwriters Laboratories.
    - b. Factory Mutual.
- G. All equipment shall be new and unused. This contractor shall warranty workmanship and equipment for a period of 1 year from acceptance by Owner.
- H. All equipment shall be compatible with existing fire control instruments system and campus fire alarm network.

## 1.07 MAINTENANCE

- A. Maintenance service:
  - 1. Installation contractor shall provide detailed information concerning its maintenance organization and after sales service.
  - 2. On request, installation contractor shall submit a proposal for a maintenance contract.
  - 3. The quality of equipment shall be such as to require low maintenance efforts. The maintenance schedule for different system parts offered shall be clearly stated at time of commissioning and shall not exceed those listed by NFPA.

- 4. Installation contractor shall own necessary test equipment most likely to be needed for correct maintenance work.
- 5. Installation contractor shall submit a complete itemized list of test equipment and special tools that are necessary to enable Owner to carry out maintenance.
- 6. Manufacturer or installation contractor shall provide, at no cost to Owner, training to Owner's maintenance and engineering staff for all new fire alarm systems proposed for use. This training shall take place at the School District Office.
- B. Maintenance stock: Manufacturer shall guarantee in writing the supply of system spare parts, test equipment, and software for at least 3 years after shipment of fire alarm system.

## PART 2 - PRODUCTS

## 2.01 ACCEPTABLE MANUFACTURERS

A. System shall be as manufactured by Silent Knight (District standard). No substitutions.

## 2.02 INITIATING DEVICES AND NOTIFICATION APPLICATIONS

- A. Audible/visual notification appliances:
  - 1. Additional audible/visual annunciators:
    - a. Contractor shall include in alternate bid to Owner all material and labor costs associated with furnishing and installation of ten audible/visual annunciator units in addition to those indicated on Drawings. Units shall be located in the field by the local fire department official.
    - b. Provide all labor and materials including, but not limited to, conduit, conductors, devices, J-boxes, installation, testing, and supervision required to make the additional ten units a completely integral and functional part of the building fire alarm system.
  - 2. Contractor shall perform all design and engineering necessary to determine proper strobe light intensity as required by all applicable codes and standards for the entire facility. The results of their effort shall be reflected in shop drawing submittals for review by Owner.

## 2.03 LOCAL FIRE ALARM CONTROL UNITS - MANUFACTURED UNITS

A. Alarm sequence: The system alarm operation subsequent to the alarm activation of any manual station, or automatic detection device is to be as follows:

- 1. All selected audible alarm indicating appliances shall sound a digitized tone and voice message until silenced by the alarm silence switch at the control panel or remote annunciation.
- 2. Strobes shall display a continuous pattern until system is reset.
- 3. All doors normally held open by door control devices shall release.
- 4. The mechanical controls shall deactivate the air handling systems in accord with this Specification, California Building Code, and California Fire Code.
- 5. In the Automatic Mode, the mechanical controls shall operate the air handling systems as required. Air handling equipment shall be shut down and return fans automatically started if not already running. The control panel shall indicate "On" or "Off" status of the air handling system.
- 6. Upon reset of control panel, air handling units shall sequentially start up to reduce electrical inrush.
- 7. An alarm shall be displayed on the panel display. The alarm LED shall flash on the control panel and the remote annunciator until the alarm has been acknowledged at the control panel or the remote annunciator. Once acknowledged, this same LED shall latch on. A subsequent alarm received from another zone after acknowledged shall flash the alarm LED on the control panel and the panel display shall show the new alarm information.
- 8. A pulsing alarm tone shall occur within the control panel until acknowledged.
- 9. Activation of any system smoke detector shall initiate an Alarm Verification operation, whereby the panel will reset the activated detector and wait for a second alarm activation. If, within 1 minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described previously. If no second alarm occurs within 1 minute, the system is to resume normal operation. The Alarm Verification is to operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation is to be selectable by device.
  - a. The control panel shall have the capability to display the number of times a zone has gone into a verification mode.

#### PART 3 - MATERIALS

## 3.01 GENERAL

### 3.1.1 SYSTEM WIRING

The SLC and Data Communication Bus shall be wired with standard NEC 760 compliant wiring, no twisted, shielded or mid capacitance wiring is required for standard installations. All FACP screw terminals shall be capable of accepting 12-18 AWG wire.

### 3.1.2 SIGNALING LINE CIRCUITS

The SLC shall be capable of a wiring distance of 10,000 feet from the SLC driver module and be capable of supporting 127 devices. The communication protocol to SLC devices must be digital. Any SLC loop device, which goes into alarm, must interrupt the polling cycle for priority response from the FACP. The FACP must respond consistently to a device that goes into alarm on an SLC in under 3 seconds. The SLC shall be capable of functioning in a class A or class B configuration.

### 3.1.3 SLC LOOP DEVICES

Devices supported must include analog photoelectric, ionization smoke detectors, analog heat detectors, contact monitoring modules and relay output modules. There is to be no limit to the number of any particular device type up to the maximum of 127 that can be connected to the SLC.

## 3.1.4 ADDRESSABLE DETECTOR FUNCTIONS

The products of combustion detectors must communicate analog values using a digital protocol to the control panel for the following functions:

Automatic compliance with NFPA 72 standards for detector sensitivity testing

Drift compensation to assure detector is operating correctly

Maintenance alert when a detector nears the trouble condition

Trouble alert when a detector is out of tolerance

Alert control panel of analog values that indicate fire.

- 3.02 SYSTEM OPERATION
- 3.2.1 ALARM

When a device indicates an alarm or supervisory condition the control panel must respond within 3 seconds. The General Alarm or Supervisory Alarm LED on the annunciator(s) shall light and the LCD shall prompt the user as to the number of current events. All notification circuits associated

with the alarm or supervisory condition shall activate. If the digital dialer is being utilized it shall transmit a signal to the digital alarm receiving unit. The alarm shall also cause the appropriate door holders and air handlers to shut down. If employed all elevators shall return to the main level or an alternate level when required by the elevator specification or building code. The alarm information must be stored in event memory for later review. Event memory shall be available at the main and all remote annunciators. The alarm memory must be capable of storing up to 1000 events.

When the alarmed device is restored to normal, the control panel shall be required to be manually reset to clear the alarm condition, except that the alarms may be silenced as programmed.

*Exception:* When detectors are utilized in single station or multi-station applications they may be self- restoring.

An alarm shall be silenced by a code or Firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur (subsequent alarm feature). When alarms are silenced the silenced LED on the control panel, and on any remote annunciators shall remain lit, until the alarmed device is returned to normal.

## 3.2.2 TROUBLES

When a device indicates a trouble condition, the control panel System Trouble LED should light and the LCD should prompt the user as to the number of current events. The trouble information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators.

When the device in trouble is restored to normal, the control panel shall be automatically reset. The trouble restore information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators. A trouble shall be silenced by a code or Firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur.

## 3.2.3 SUPERVISION METHODS

The SLC loop shall be electrically supervised for opens and ground faults in the circuit wiring, and shall be so arranged that a fault condition on any loop will not cause an alarm to sound. Additionally, every addressable device connected to the SLC will be supervised and individually identified if in a fault condition. The occurrence of any fault will light a trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.

## PART 4 - EXECUTION

### 4.01 INSTALLATION

- A. General:
  - 1. The system shall be installed per manufacturer's instructions.
  - 2. Contractor shall provide all necessary technical installation documents, such as situation plans and diagrams.
  - 3. Installation of fire alarm system shall be by a fire alarm system contractor or licensed electrical contractor.
  - 4. Contractor shall be responsible for the correct location of all equipment. If there are any discrepancies between details in the proposal and real dimensions of equipment, rooms, buildings, etc., they shall be reported in writing immediately upon discovery to Owner.
  - 5. Contractor shall provide an engraved phenolic plate affixed to the outside of the Fire Alarm Control Panel that will define items in the system that will activate alarm indicating appliances. This plate shall be red with white letters and, as a minimum, be 2 in. x 5 in. in size.
  - 6. Contractor shall provide to Owner, without additional cost, all software required (including CD of all programming) to operate, service, and install fire alarm control unit along with any software required to download operating programs to fire alarm control unit. Warranties and liabilities of products of manufacturer shall not be waived by transfer of this software to Owner.
- B. Conduit/wiring systems:
  - 1. All fire alarm system wire shall be in conduit. Where raceway/wiring is exposed, it shall be in Wiremold #2300 raceway system provided by contractor. All system wiring shall be power limited. All wiring shall be rated for its application. All wiring shall be concealed to the maximum extent possible.
  - All junction boxes and device mounting boxes shall be identified as being a part of the fire alarm system. Boxes shall be labeled both internally and on junction box cover as "F/A". All concealed boxes shall be spray-painted red for identification purposes.
  - 3. Electrical wire type FPL for power limited will be used for fire alarm and detection system.

- 4. For devices requiring higher currents, such as alarm horns, bells, sirens, etc., wire cross-sectional area shall be selected to limit voltage drop to below 10% of nominal voltage.
- 5. Data transmission cables shall be of a type recommended by manufacturer and listed for fire alarm use.
- 6. All wiring shall be of the same approved type and shall meet requirements of the National Electrical Codes. All wires shall be labeled and referenced on "as-built" drawings. All circuits shall be checked to be free from any mechanical failures, i.e., open circuits, shorts between conductors or shorts to earth ground.
- 7. Exact installation wiring counts shall be shown on "as-built" wiring diagrams and installation drawings required, upon project acceptance.
- C. Detectors and bases:
  - 1. All detectors and bases shall be installed in accord with relevant codes and manufacturer's guidelines as indicated in their documentation.
  - 2. Ceiling detectors shall not be located within 60 in. of air handling supply grilles.

## PART 5 - ACCESSORY COMPONENTS

5.01 The FACP shall support the following devices:

Addressable & Analog Photoelectric Smoke detector Addressable & Analog Ionization Sensor Addressable & Analog Heat Sensor Addressable Relay Module Duct Detector Enclosure Addressable Input Module Mini Input Module Addressable Relay Module Duct Detector Housing with Built -In Relay Remote Test Switch For Duct Housing Addressable Pull Station 80 Output LED Driver Board

The FACP supports these other Silent Knight devises via addressable or conventional inputs.

Single Action Pull Station – Key Reset Double Action Pull Station – Key Reset Combination Speaker Strobe or Strobe only devices

## 5.02 MANUAL FIRE ALARM STATIONS

Manual Fire Alarm Stations shall be non-coded, break glass, single or double action type, with a key operated test reset lock in order that they may be tested, and so designed that after actual emergency operation, they cannot be restored to normal except by use of a key. The reset key shall be so designed that it will reset the manual Pull Station and open the FACP cabinet without use of another key. An operated station shall automatically condition itself so as to visually detected, as operated, at a minimum distance of fifty feet, front or side. Manual stations shall be constructed of die cast metal with clearly visible operating instructions on the front of the station in raised letters. Stations shall be suitable for surface mounting on matching back box, or semi-flush mounting on a standard single gang box, and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) dependent on Manual Station accessibility or per local requirements. Manual Stations shall be installed in conjunction with an Addressable Input Module (AIM or MIM).

## 5.03 Notification Devices Shall be Silent Knight per the Contract Drawings

The visible and audible/visible signaling devices shall be compatible with the 5808 or 5496 as stated in the installation manuals and be Listed with Underwriters Laboratories Inc. per UL 1971 and/or 1638. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition. The notification appliance (combination audible/visible units only) shall produce a peak sound output of 90dba or greater as measured in an anechoic chamber. The visible signaling appliance shall maintain a minimum flash rate of 1Hz or greater regardless or power input voltage. The appliance shall also be capable of meeting the candela requirements of the blueprints presented by the Engineer and ADA. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 20-30 volts with either direct current or full wave rectified power.

## 5.04 SMOKE DETECTORS

All detectors shall be the Silent Knight Addressable Photoelectric Smoke Detector or Ionization Smoke Detector or the heat detector. The base shall be the Silent Knight model. The Smoke detectors shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The sensitivity of the detector shall be capable of being measured by the control panel without the need for external test apparatus. The detector shall be a double EE-prom technology and be programmed using the internal programming loop located on the FACP or through the use of the Hand Held Programmer.

#### PART 6 - WIRING

#### 6.01 INSTALLER'S RESPONSIBILITIES

The installer shall coordinate the installation of the fire alarm equipment.

All conductors and wiring shall be installed according to the manufacturer's recommendations. It shall be the installer's responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.

#### 6.02 INSTALLATION OF SYSTEM COMPONENTS

System components shall be installed in accordance with the latest revisions of the appropriate NFPA pamphlets, the requirements contained herein, National Electrical Code, local and state regulations, DSA, the requirements of the fire department and other applicable authorities having jurisdiction (AHJ).

All wire used on the fire alarm system shall be U.L. listed as fire alarm protection signaling circuit cable per California Electrical Code.

### PART 7 - WARRANTY AND FINAL TEST

7.01 GENERAL

The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for one year 18 months from the date of final acceptance.

#### 7.02 FINAL TEST

Before the installation shall be considered completed and acceptable by the awarding authority, a test of the system shall be performed as follows:

The contractor's job foreman, a representative of the Owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.

At least one half of all tests shall be performed on battery standby power.

Where application of heat would destroy any detector, it may be manually activated. The communication loops and the indicating appliance circuits shall be opened in at least two locations per circuit to check for the presence of correct supervision circuitry.

When the testing has been completed to the satisfaction of both the contractor's job foreman and owner, a notarized letter cosigned by each attesting to the satisfactory completion of said testing shall be forwarded to the Owner and the fire department.

The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.

Prior to final test the fire department must be notified in accordance with local requirements.

### 7.03 AS BUILT DRAWINGS, TESTING, AND MAINTENANCE INSTRUCTIONS

7.3.1 AS BUILT DRAWINGS

A complete set of reproducible "as-built" drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the Owner upon completion of system.

### 7.3.2 OPERATING AND INSTRUCTION MANUALS

Operating and instruction manuals shall be submitted prior to testing of the system. Three complete sets of operating and instruction manuals shall be delivered to the owner upon completion. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with U.L. Standard 864.

## END OF SECTION 260720

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## SECTION 311000 - 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 312000: Site Grading
- B. Section 312500: Construction Storm Water Pollution Prevention

## 1.04 GEOTECHNICAL ENGINEERING REPORT / GEOTECHNICAL ENGINEER

- A. A geotechnical engineering report has not been prepared for this project.
  - 1. Copies of this report and any addenda are available for review at the office of the Owner's Representative.
- B. The Geotechnical Engineer employed by the Owner to perform observation, testing and reporting during construction in accordance with the contract documents is Pacific Materials Laboratory, Inc., Telephone (805) 964-6901 (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*, 2021 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 *Stormwater Best Management Practice Handbook: Construction*, January 2015 edition, published by 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 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; record a video of the entire site, including adjacent improvements and / or properties along the site boundary and street frontage, and provide a copy of the video in DVD 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 312000.

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 9 inches 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 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 foundation 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 and pavement areas, seal all exposed openings larger than 6 inches in diameter with stiff concrete placed within the pipeline/conduit to a minimum of three (3) lineal feet beyond the opening and rodded to remove voids; provide watertight cap or plug for pipelines / conduits 6 inches or less in diameter. All such sealing 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 and pavement areas, remove the top and walls to 24" minimum below finish grade, 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 312500 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 312500 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 312000 - 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 311000: Site Clearing
- B. Section 312300: Trenching and Backfilling
- B. Section 312500: Construction Storm Water Pollution Prevention
- C. Section 321216: Asphalt Concrete Paving

## 1.04 GEOTECHNICAL ENGINEERING REPORT / GEOTECHNICAL ENGINEER

- A. A geotechnical engineering report has been not prepared for this project by Pacific Materials Laboratory, Inc., as follows:
  - 1. Copies of this report and any addenda are available for review at the office of the Owner's Representative.
- B. The Geotechnical Engineer employed by the Owner to perform observation, testing and reporting during construction in accordance with the contract documents is Pacific Materials Laboratory, Inc., Telephone (805) 964-6901 (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,* 2021 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 unincorporated area, grading shall conform to the *Santa Barbara County Grading Ordinance No.* 4477.
- C. 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 01510 Field Engineering.

## 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.
  - Gabion rock aggregate (thickness to be specified by Construction-Phase Geotech) imported from Bee Rock Mine, encapsulated with Mirafi 600X geotextile fabric between aggregate and subgrade soil below and Mirafi 140N geotextile fabric between aggregate and base material above.

### 2.05 EROSION CONTROL MATERIALS

A. FOR SLOPES LESS THAN 5% (20H:1V):

Mulch.

B. FOR SLOPES LESS THAN 10% (10H:1V):

Jute mesh.

C. FOR SLOPES LESS THAN 25% (4H:1V):

North American Green S 75 straw blanket.

D. FOR SLOPES GREATER THAN OR EQUAL TO 25% (4H:1V):

North American Green SC 150 straw / coconut blanket.

E. 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; video record the entire site, including adjacent improvements and / or properties along the site boundary and street frontage, and provide a copy of the video in DVD 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, locate finish grade elevations and features such as swales, ridge lines, etc. by scale from known points shown on the Drawings.
- 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 ½ inch (0.04 foot) 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 311000: 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 312000, 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 areas and at least 6 inches of subgrade material below the sand course in walkway 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 areas and at least 6 inches below sand layer in walkway 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 encapsulated with geotextile fabric conforming to Paragraph 2.04 above between the aggregate and subgrade soil below and between the 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

- 3. Provide and install erosion control materials per Section 2.05 hereof on all disturbed areas in accordance with the manufacturer's installation guidelines.
- 4. 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.
- 5. 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.

#### 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 312500 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 312500 of these Specifications and with the *Construction BMP Online Handbook*, January 2015 edition, available online from the California Stormwater Quality Association

## 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 [Contractor is to acknowledge with initials each submittal included] <u>Initials:</u>

- \_\_\_\_\_ 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

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### SECTION 312300 - TRENCHING AND BACKFILLING

### PART 1 - GENERAL

#### 1.01 SUMMARY

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 312500: Construction Storm Water Pollution Prevention
- B. Section 334100: Storm Drainage Piping

#### 1.04 STANDARD SPECIFICATIONS

- A. Construction materials and methods shall be in accordance with the *Standard Specifications for Public Works Construction,* 2021 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 *Stormwater Best Management Practice Handbook: Construction*, January 2015 edition, published by 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, 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. Bedding material used to stabilize yielding trench subgrade shall be 1/2" x No. 4 crushed rock.

## 2.02 TRENCH BACKFILL MATERIAL

A. Trench backfill material from 12 inches above the top of pipe to finish grade in unpaved areas or to bottom of aggregate base material in paved areas shall be native soil, or imported soil, meeting the requirements of the Construction-Phase Geotechnical Engineer.

- B. 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 321613.13 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 3.10-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 as directed by the 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 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 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 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 12" below the aggregate base course in paved areas and the upper 6" below the base layer in walkway 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, spaced as necessary but not to exceed 4-feet on center. Line and grade shall be confirmed by Licensed Surveyor prior to ordering slurry.

#### 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, spaced as necessary but not to exceed 4-feet on center. Line and grade shall be confirmed by Licensed Surveyor prior to ordering concrete.

#### 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 312500 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 312500 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 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 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.
- F. Employ a Licensed Arborist to repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Owner's Representative.
- 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.

### 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 [Contractor is to acknowledge with initials each submittal included] Initials:

- 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 312300

### **SECTION 312500 - 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 311000: Site Clearing
- B. Section 312000: Site Grading
- C. Section 312300: Trenching and Backfilling
- D. Section 321216: Asphalt Concrete Paving
- 1.04 STANDARD SPECIFICATIONS
  - A. Construction materials and methods shall be in accordance with the *Standard Specifications for Public Works Construction,* 2021 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 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 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 onor 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 [Contractor is to acknowledge with initials each submittal included] Initials:

- \_\_\_\_\_ Letter of explanation attached for each submittal not included.
- \_\_\_\_\_ All submitted products are as specified.

#### B. SUBMITTAL SCHEDULE

- 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 321216 - ASPHALT CONCRETE PAVING

### PART 1 - GENERAL

#### 1.01 SUMMARY

A. Includes materials, equipment, transportation and labor as required for construction of asphalt concrete pavement including, but not limited to: subgrade preparation; aggregate base course; asphalt surfacing; seal coat.

#### 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 312500: Construction Storm Water Pollution Prevention
- C. Section 321723: Painted Pavement Markings

#### 1.04 REFERENCE SPECIFICATIONS / REFERENCE DETAILS

- A. Construction materials and methods shall be in accordance with the *Standard Specifications and Standard Plans of the State of California Department of Transportation, 2010 editions* (CalTrans Standards). Where Metric Units of measure are used in the referenced Standards, the equivalent English Units shall be used. (Reference Specifications / Reference Details).
- B. Construction materials and methods shall be in accordance with the *Standard Specifications for Public Works Construction*, 2021 edition (SSPWC), published by Building News, Inc., except as modified or otherwise specified herein (hereinafter the Standard Specifications).
- C. In case of conflict between Reference Specifications / Details and these Project Specifications / Details, the more stringent provision shall govern, as determined by the Owner's Representative and Engineer.

#### 1.05 GENERAL REQUIREMENTS

- A. R-VALUE TESTING
  - 1. When the thicknesses of asphalt concrete surfacing and aggregate base courses given on the Detail Drawings are estimated, the actual thicknesses shall be determined as follows:

- a. When the areas to be paved have been brought to rough subgrade elevation pursuant to requirements of Paragraph 3.02 of this Section, the Construction-Phase Geotechnical Engineer shall sample and test the subgrade soil for R-Value determination.
- b. Based on the results of R-Value testing, the Construction-Phase Geotechnical Engineer will calculate the actual thicknesses of asphalt concrete surfacing and aggregate base courses required for the Traffic Indexes called for on the Detail Drawings.
- B. All work involving excavation including that for water, sewer, storm drain and utility conduits shall be completed and reviewed and approved by the Owner's Representative and the structural backfill reviewed and tested for compaction and approved by the Construction-Phase Geotech before paving and other permanent surface construction may commence.
- C. Compaction of fill, subgrade and base courses as well as trench bedding and backfill shall be tested for compliance with applicable requirements by the Construction-Phase Geotechnical Engineer.
- D. All existing and proposed valve and utility box covers, manhole and cleanout frames and covers, and catch basin frames and grates shall be carefully adjusted to finish grade in paved areas.
- E. Contractor shall provide vehicular and pedestrian traffic control including installing and maintaining fencing, signs, flagmen, lights, and barricades, as required.
- F. Contractor shall employ a Licensed Surveyor to provide line and grade control stakes for construction of subgrade, base and paving courses.

### 1.06 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.

### 1.07 RECORD DOCUMENTS

A. Comply with requirements of Division 1, "Project Record Documents" section.

### PART 2 - MATERIALS

### 2.01 HEADERS

A. Wood for headers shall be redwood.
### 2.02 AGGREGATE BASE

A. Aggregate base material shall be Crushed Aggregate Base conforming to Section 200-2.2 of the Standard Specifications (SSPWC).

## 2.03 ASPHALT CONCRETE

- A. Asphalt concrete shall be the product of mixing mineral aggregate and a maximum of 15 percent reclaimed asphalt pavement (RAP) with paving asphalt, in conformance with Section 203-6 of the Standard Specifications (SSPWC).
- B. Paving Asphalt shall be performance grade PG 64-10, in conformance with Section 203-1 of the Standard Specifications (SSPWC).
- C. Asphalt concrete designated by class and grade for various applications shall be as follows:

1.	Finish Course, Traffic:	C2-PG 64-10-RAP
2.	Base Course, Traffic: (If more than 1 layer)	B-PG 64-10-RAP
3.	Overlay, Traffic:	C2- PG 64-10-RAP
4.	Finish Course, Non-Traffic:	D2- PG 64-10-RAP
5.	Leveling Course and Skin Patching:	D2- PG 64-10-RAP

- 2.04 TACK COAT
  - A. Paint binder shall be ss-1h emulsified asphalt conforming to Section 203-3 of the SSPWC.
- 2.05 SEALCOAT ASPHALT BASED
  - A. Materials shall conform to Section 203-9 of the SSPWC.
- 2.06 The composition of all cutback and emulsified asphalt used in the manufacture, placement or maintenance of asphalt concrete pavement shall conform with the County of Santa Barbara Air Pollution Control District Rule 329. Contractor shall maintain records available for inspection for a period of 2 years which document the types and amounts of asphalts used.
- 2.07 Paint for pavement striping and marking shall conform to Section 321723 hereof.
- 2.08 Reflective glass beads are required for striping and marking in roadways but not for those in parking lots.

- 2.09 Posts for mounting signs shall be 2" standard weight (3.65 pounds per foot) galvanized steel pipe, supplied with galvanized threaded cap.
- 2.10 Pre-cast concrete wheelstops shall be 4'-long, anchored with two 18"-long #4 rebars.

## PART 3 - EXECUTION

### 3.01 PROTECTING EXISTING PAVEMENT AT SAWCUT

- A. After marking location of proposed sawcut on existing A.C. pavement surface but before cutting, document condition of pavement along sawcut line; provide photographic record to Owner's Representative, with any existing damage highlighted.
- B. Protect integrity of sawcut line and existing pavement to remain behind sawcut line until construction of conforming improvements.
- C. If existing pavement is broken-off or otherwise damaged along or behind sawcut line before new pavement is placed, sawcut a new conform line parallel with, full length of, and sufficient distance behind original sawcut line so as to remove damaged pavement and / or irregularity along conform line and replace with new pavement section, at no additional cost to Owner.
- D. Overcutting is not allowed in sawcutting of existing asphalt concrete pavement and appurtenant concrete improvements; the saw shall be stopped short of an overcut and the remainder of the cut constructed by drilling, to make a smooth, clean corner.

#### 3.02 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 and the limits of curb, gutter, and sidewalk contiguous with the pavement.
- 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. Before proceeding with scarification and recompaction of soil below subgrade level, request observation and testing of surfaces exposed per Paragraph 3.02B hereinabove by Construction Phase Geotechnical Engineer who will determine:
  - 1. Whether or not scarification and recompaction should be performed. Scarification of soil to 9" below subgrade elevation and recompaction to minimum 95% of maximum density is required unless otherwise recommended in writing during construction by the Geotechnical Engineer.

- 2. Whether or not stabilization of subgrade soils pursuant to Paragraph 3.02H hereinbelow is necessary. If yielding subgrade warranting stabilization is observed, corrective measures will be recommended by Geotechnical Engineer and direction for proceeding given by District as extra work pursuant to provisions of the Contract Documents.
- D. For fill required to achieve subgrade elevations, use on-site soil or imported soil meeting the requirements of the Geotechnical Engineer for fill material. 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 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 Geotechnical Engineer 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 Geotechnical Engineer; surface shall be firm and unyielding. Address yielding or overwet / pumping subgrade areas as recommended by the Construction-Phase Geotechnical Engineer.
- I. Request observation and testing of finish subgrade condition by Construction-Phase Geotechnical Engineer and do not proceed with paving operations until subgrade condition has been approved.

# 3.03 GRADING TOLERANCES

- A. Do all rough and finish grading as necessary to bring the site to the lines and grades called for on the Drawings and within the following tolerances:
  - 1. Finish surface of the subgrade soil beneath base course shall not vary more than 1/2 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 surface of the base course for pavements and for walks, ramps, gutters, driveway aprons, and other pavement-related structures shall not vary more than 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.

### 3.04 WOOD HEADERS

A. Construct wood header to form all pavement edges not contained by concrete.

#### 3.05 AGGREGATE BASE

- A. Place aggregate base material and compact to minimum 95% of maximum density.
- B. Confirm that finish base course has been constructed to the design elevation, slope, and cross section within tolerances specified in Subsection 3.03 hereof. Reconstruct and reconfirm as necessary for conformance before proceeding with placement of surfacing.

#### 3.06 TACK COAT

A. Apply a paint binder of asphaltic emulsion at the rate of 0.15 gallons per square yard of surface to existing vertical surfaces against which paving will be placed and between pavement courses constructed more than 24 hours apart.

### 3.07 SURFACING

- A. Construct asphalt concrete surfacing in conformance with Section 302-5 of the SSPWC.
- B. If total asphalt concrete thickness is greater than 4 inches (0.33 foot), spread and compact it in two (2) equally-thick layers with the top layer (finish course) not less than 2 inches (0.17 foot) in compacted thickness.
- C. Construct the asphalt concrete true to grade and cross section. Upon completion, the surface shall be free of any unevenness greater than 1/4 inch (0.02 foot) when checked with a 10-foot long straightedge placed on the surface of the pavement.

#### 3.08 ADJUSTING STRUCTURES

A. Carefully adjust the perimeter edge of valve and utility box covers, manhole and cleanout frames and covers, and catch basin frames and grates to conform with finish pavement surface.

### 3.09 FLOOD TEST

- A. After construction of A.C. pavement and appurtenant concrete features but before seal coating and painting striping and markings, conduct a flood test to review surface drainage, as follows:
  - 1. Supply and discharge water in sufficient quantity to completely wet and cover all A.C. pavement and concrete gutter areas and allow to drain/dry for one hour at 70° F or warmer. Mark the outline limits of residual standing water deep enough to cover a 5 cent piece.
  - 2. Remove and replace A.C. pavement and concrete gutter improvements at no additional cost to the Owner, as necessary to provide positive surface drainage and to prevent ponding of water on pavement surfaces and in gutters. Substitution of asphalt concrete skin patch in lieu of removal and replacement of pavement shall be at the sole discretion of the Owner.
  - 3. Conduct additional flood testing to confirm success of corrective measures.

# 3.10 REMOVING EXISTING PAVEMENT MARKINGS

A. Remove existing striping and pavement and curb markings which conflict with new work shown on the plans by water blasting or by sand blasting, at contractor's option; however, if water blasting is used and does not completely remove existing striping and markings as determined by the Owner's Representative, follow-up use of sand blasting is required. All A.C. pavement areas subjected to blasting (water or sand) shall be seal coated.

### 3.11 SEALCOAT

- A. Construct Sealcoat at the rate of 0.45 gallons per square yard of surface on all new and existing pavement within work site in accordance with Section 302-8 of the SSPWC.
- B. A tack coat conforming to Section 302-8.2.1 shall be applied to existing pavement surfaces in advance of sealcoat.
- C. Sealcoat shall not be applied to new asphalt pavement until the pavement has cured for 7 days.

### 3.12 PAVEMENT MARKING

A. See Section 321723.

### 3.13 SIGNAGE

A. Provide and install signs in accordance with the Drawings and Detail Drawings.

### 3.13 WHEELSTOPS

A. Install pre-cast concrete wheelstops anchored with two 18"-long #4 rebars.

# 3.14 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 [Contractor is to acknowledge with initials each submittal included] Initials:

- \_\_\_\_\_ Letter of explanation attached for each submittal not included.
- \_\_\_\_\_ All submitted products are as specified.

# B. SUBMITTAL SCHEDULE

- \_\_\_\_\_ 1. Submit mix design for Asphalt Concrete.
- 2. Submit laboratory test results for Crushed Aggregate Base.
- \_\_\_\_ 3. Submit mix design for Sealcoat.

END OF SECTION 321216

## SECTION 321313 - SITE CONCRETE

### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. Provide materials, equipment and transportation and perform labor as required for construction of Portland cement concrete improvements including, but not limited to: subgrade preparation; aggregate or sand base course; concrete pavement, curbs, gutters, walkways, ramps, drainage structures, post footings.
- B. This work does not include concrete associated with the buildings or retaining walls.
- 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 WORK INCLUDED
  - A. Form work, shoring, bracing and anchorage
  - B. Concrete reinforcement and accessories
  - C. Cast-in-place concrete
- 1.04 RELATED WORK SPECIFIED ELSEWHERE
  - A. Section 015100: Field Engineering
  - B. Section 015723: Temporary Storm Water Pollution Control
  - C. Section 312000: Site Grading
  - D. Section 321313.10: Site Concrete Reinforcement
  - E. Section 334100: Storm Drainage
- 1.05 REGULATORY REQUIREMENTS
  - A. Construction shall comply with the *California Code of Regulations, Title 24, Part 2* (the *California Building Code*), most recent effective edition.
- 1.06 REFERENCE SPECIFICATIONS
  - A. ASTM C33 Concrete Aggregates

- B. ASTM C94 Ready Mixed Concrete
- C. ASTM C150 Portland Cement
- D. ASTM A615 Deformed and Plain Billet-steel for Concrete Reinforcement
- E. ASTM C309 Liquid Membrane-forming Compounds for Curing Concrete
- F. California Building Code, Chapter 19, Concrete
- G. Standard Specifications for Public Works Construction, 2021 edition (SSPWC), published by Building News, Inc.
- 1.07 GENERAL REQUIREMENTS
  - A. R-VALUE TESTING
    - 1. When the thicknesses of concrete surfacing and aggregate base courses for vehicular traffic areas given on the Detail Drawings are estimated, the actual thicknesses shall be determined as follows:
      - a. When the areas to be paved with concrete have been brought to rough subgrade elevation pursuant to requirements of Section 312000 hereof, the Construction-Phase Geotechnical Engineer shall sample and test the subgrade soil for R-Value determination.
      - b. Based on the results of R-Value testing, the Construction-Phase Geotechnical Engineer will calculate the actual thicknesses of concrete surfacing and aggregate base courses required for the Traffic Index(es) called for on the Detail Drawings.
  - B. All work involving excavation including that for water, sewer, storm drain and utility conduits shall be completed and reviewed and approved by the Owner's Representative and the structural backfill reviewed and tested for compaction and approved by the Construction Phase Geotechnical Engineer before paving and other permanent surface construction may commence.
  - C. Compaction of fill, subgrade and base courses as well as trench bedding and backfill shall be tested for compliance with applicable requirements by the Construction-Phase Geotechnical Engineer. Compaction tests shall be in accordance with ASTM Standard D-1557-91.
  - D. All existing and proposed valve and utility box covers, manhole and cleanout frames and covers, and catch basin frames and grates shall be carefully adjusted to finish grade in paved areas.
  - E. Contractor shall provide vehicular and pedestrian traffic control including installing and maintaining fencing, signs, flagmen, lights, and barricades, as required.

- F. Contractor shall employ a Licensed Surveyor to provide line and grade control stakes for construction of subgrade, base, and paving and for construction of curb and gutter, walks, and drainage structures.
- 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 RECORD DOCUMENTS

- A. Comply with requirements of Division 1, "Project Record Documents" section, and following:
  - 1. 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.
- 1.10 QUALITY ASSURANCE
  - A. Specified cement and specified aggregates shall be supplied from single sources only.
- 1.11 TESTS
  - A. Testing and analysis of concrete will be performed under provisions of Division 1, "Testing and Inspection" section.
- 1.12 REQUIRED SACRIFICIAL CONCRETE MOCK-UP
  - A. Prior to scheduling first concrete pour for permanent improvements, construct a trial concrete slab with monolithic curb to demonstrate jointing and finishing techniques for approval or comment by Owner.
  - B. Sacrificial slab shall be minimum 10'-long, 5'-wide, 4"-thick un-reinforced concrete with monolithic 6"-high and wide curb; concrete shall be per approved mix design.
  - C. Construct one transverse control joint and one transverse expansion joint continuous through slab and curb.
  - D. Construct chamfered and / or radiused edge treatments as applicable to the work.
  - E. Construct medium broom finish across  $\frac{1}{2}$  of slab and heavy broom finish across  $\frac{1}{2}$  of slab.
  - F. Review with Owner and Architect / Engineer; construct improvements throughout project in accordance with approved mock-up and revisions requested by Owner.

- G. Maintain mock-up for comparison throughout the construction period; remove and dispose of offsite after completion of concrete improvements.
- H. Refer to Paragraph 3.10 for colored concrete mockup requirements.

## PART 2 - MATERIALS

### 2.01 BASE MATERIAL

- A. Sand base material shall be imported clean sand of such gradation that 90% to 100% passes through a No. 4 sieve, less than 5% passes through a No. 200 sieve, and the Sand Equivalent value is greater than or equal to 40. For processed sand, a maximum of 15% shall pass through a No. 200 sieve.
- B. Aggregate base material shall be Crushed Aggregate Base conforming to Section 200-2.2 of the Standard Specifications (SSPWC).
- 2.02 FORM MATERIALS
  - A. GENERAL: Shall conform to California Building Code, Section 1906, Formwork, Embedded Pipes and Construction Joints.
  - B. PLYWOOD FORMS: Douglas Fir species; solid-one-side, sound undamaged sheets. Unless otherwise called for on plans, surface of form side against concrete shall provide a medium density texture.
  - C. LUMBER: Douglas Fir species; construction grade with grade stamp clearly visible.
  - D. STEEL FORMS: Minimum 16 gage thick, stiffened to support weight of concrete with minimum deflection.
  - E. FORM TIES: Removable metal of adjustable length, cone ends.
- 2.03 REINFORCING STEEL
  - A. All reinforcing shall be fabricated from steel manufactured in the United States.
  - B. Reinforcing steel shall be deformed billet-steel for concrete reinforcement conforming to ASTM A-615, Grade 60 for bar sizes No. 4 and larger, Grade 40 for bar size No. 3, Grade 60 acceptable for all sizes.
  - C. Welded bars shall conform to the most recent issue of ASTM Standard A-706, Grade 60 for all bar sizes.
- 2.04 CONCRETE MATERIALS
  - A. CEMENT: Shall be Type II, low alkali (no higher than 0.4%), conforming to ASTM C-150.

- B. AGGREGATES (COARSE AND FINE): All aggregate used in concrete shall conform to ASTM C-33. Aggregate shall be uniformly graded, with the maximum aggregate size being <sup>3</sup>/<sub>4</sub>" to 1", and the ratio of coarse aggregate to fine aggregate being approximately 60% to 40% (by weight), respectively.
- C. Coarse and fine aggregate (sand) are to come from a source proven to have non-reactive characteristics. Coarse aggregate which is heavy media processed (Saticoy, Sisquoc), Santa Margarita rock, or San Gabriel rock will be considered as meeting the criteria of non-reactivity. Moorpark sand (Quality, Best, Blue Star) will be considered as meeting the requirements of non-reactivity. Other aggregates meeting or exceeding the aggregate reactivity characteristics of the aggregates listed above are acceptable upon submittal of adequate documentation (ASTM C-289 and ASTM C-277 test results that are not more than 2 years old).
- D. WATER: shall be clean, suitable for human consumption, and not detrimental to concrete.

# 2.05 CURING COMPOUND

- A. Shall be water-base liquid membrane-forming compound conforming to ASTM C309, 1100 Clear Series manufactured by W.R. Meadows, Inc., Hampshire, Illinois, or equivalent, for use on exterior flatwork only.
- B. Liquid membrane-forming compound shall be applied at the rate of 1 gallon per 200 square feet, in 2 coats, the second coat applied at right angles to the first.
- 2.06 BONDING AGENT
  - A. Shall be polyvinyl acetate HIBOND manufactured by Lambert Corporation, Orlando, FL, LOCK BOND NO. 906 manufactured by MacklanBurg-Duncan Co., City of Industry, CA, or equivalent.
- 2.07 CONCRETE MIX
  - A. Mix and deliver concrete in accordance with *California Building Code*, Section 1905A.
  - B. Have mix designed and certified by a registered civil engineer, licensed in California.
  - C. Select proportions for concrete in accordance with the approved design mix.
  - D. Provide concrete conforming to the following criteria:

Element	Strength Min. 28-day	Weight	Min. Cement Content	Max. Agg. Size	Max Slump	Wat/Cem Ratio	Admixtures
Curbs, gutters, ramps, walks & flatwork	3,000 psi	150 pcf	5.5 sacks/C.Y.	3/4-inch	4 inches	0.55	See p. E
Drainage & stair structures; pavement	4,000 psi	150 pcf	6.5 sacks/C.Y.	1-inch	4 inches	0.50	See p. E

# E. Include the following admixtures:

- 1. 1.5% air entrainment
- 2. 15% fly ash, Type N or F only
- 3. Low range water reducer
- F. The use of a pea gravel mix (3/8" aggregate) concrete is expressly prohibited.

### 2.08 EXPANSION JOINT

- A. Filler material shall be preformed bituminous type conforming to ASTM Standard D-1751.
- B. Dowel tubing shall be plastic SPEED DOWEL supplied with sacrificial plate for attaching to form, as supplied by Aztec Concrete Accessories, or approved equivalent.
- 2.09 REMOVABLE JOINT CAP
  - A. High impact polystyrene, depth equal to width of expansion joint filler, supplied in 10-foot lengths, as manufactured by Concrete Tie, or equivalent.
  - B. Where polyurethane sealant primers are used, a bondbreaker tape shall be applied prior to caulking.

## 2.10 JOINT SEALANT

- A. For crack-control and expansion joints shall be chemical-cure, two-component, polyurethanebase, non-sag elastomeric Sikaflex-2cNS manufactured by Sika Corporation, Lyndhurst, NJ, or approved equivalent. Color: Limestone Grey.
- 2.11 ABRASIVE STAIR NOSING
  - A. PRODUCT: Type 231BF (3 inch wide) by Wooster or approved equivalent by Balco or American Safety Tread.
  - B. COLOR: Safety Yellow for Drop-Off / Loading Isle Curb, Black for Exterior Stairs and Steps, or as required by Architect; confirm in advance. Color used must provide 70% contrast from color of curb or stair tread surface.

C. LENGTH: Length of stair tread or of Drop-off / Loading Isle curb, less 3 inches on each end.

## 2.12 NON-SLIP PAINT

- A. PRODUCT: For visually impaired warning strips shall be EPOTUFF ES-83 Epoxy as manufactured by No Skidding Products, Inc. [(416) 667-1783], or approved equivalent.
- B. COLOR: Safety Yellow for Drop-Off / Loading Isle Curb (special order), Black for Exterior Stairs and Steps, or as required by Architect; confirm in advance. Color used must provide 70% contrast from color of curb or stair tread surface.
- 2.13 EPOXY, FLATWORK DOWELS
  - A. Epoxy used for grouting rebar dowels to maintain joint integrity between site flatwork components (curbs, gutters, walkways, ramps) shall be Simpson SET-XP Adhesive, ICC No. ESR-2508, or equivalent. Pull tests are not required.

#### 2.14 WATERPROOFING

- A. Shall be MERLEX SUPER BLOCKADE cement-based coating as supplied by Concrete Tie Co., Ventura, CA, or approved equivalent, applied in two coats.
- B. Color of first coat: white; color of second coat: gray.
- 2.15 SKATEBOARD DETERRENT DEVICES
  - A. Grinder Minders as manufactured by Grind To A Halt, Inc., or equivalent, with brushed stainless steel finish.
  - B. Install in strict accordance with manufacturer's specified procedures.
  - C. Install skate stop devices on raised curbs and walls contiguous with or adjacent to paved walking and driving surfaces, unless waived in writing by the Districts. Skate stop devices shall not be installed where top of curb or wall is part of a walking surface and could result in a trip hazard (such as pavement edge curb flush with contiguous sidewalk).
  - D. On ramps, install skate stop devices on edge curbs and walls centered between each pair of handrail posts, not to exceed 4' spacing, continuous the full length of the ramp. Adjust spacing as necessary to clear edge of expansion, construction, or crack control joint by 3 inches.
  - E. On curbs and walls not containing rail posts, install skate stop devices located 18" from end of, or angle point in, curb / wall and at 36" maximum spacing continuous along full length of curb / walls.
  - F. Provide Shop Drawing detailing proposed locations of all skate stop devices for review and approval in advance of installation.

# 2.16 DETECTABLE WARNING PAVERS

- A. MANUFACTURER: Wausau Tile, or equivalent.
- B. PRODUCT: Precast Concrete Truncated Dome ADA Compliant Warning Paver.
- C. COLOR: Terra Cotta.
- D. APPLICATION: Subject to vehicular traffic loading.
- E. INSTALLATION: In accordance with manufacturer's recommendations.

### PART 3 – EXECUTION

### 3.01 PROTECTING EXISTING CONCRETE AT SAWCUT

- A. After marking location of proposed sawcut on existing concrete improvement surface but before cutting, document condition of concrete along sawcut line; provide photographic record to Owner's Representative, with any existing damage highlighted.
- B. Protect integrity of sawcut line and existing concrete improvements to remain behind sawcut line until construction of conforming improvements.
- C. If existing concrete is broken-off or otherwise damaged along or behind sawcut line before new concrete is placed, sawcut a new conform line parallel with, full length of, and sufficient distance behind original sawcut line so as to remove damaged concrete and / or irregularity along conform line and replace, at no additional cost to Owner.
- D. Overcutting is not allowed in sawcutting of existing concrete pavement and flatwork; the saw shall be stopped short of an overcut and the remainder of the cut constructed by drilling, to make a smooth, clean corner.

### 3.02 GRADING PROCEDURE UNDER SITE CONCRETE IMPROVEMENT 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 and the limits of curb, gutter, sidewalk, 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. Before proceeding with scarification and recompaction of soil below subgrade level, request observation and testing of surfaces exposed per Paragraph 3.02B hereinabove by Construction Phase Geotechnical Engineer who will determine:

- 1. Whether or not scarification and recompaction should be performed. Scarification of soil to 9" below subgrade elevation and recompaction to minimum 95% of maximum density is required unless otherwise recommended in writing during construction by the Geotechnical Engineer.
- 2. Whether or not stabilization of subgrade soils pursuant to Paragraph 3.02H hereinbelow is necessary. If yielding subgrade warranting stabilization is observed, corrective measures will be recommended by Geotechnical Engineer and direction for proceeding given by District as extra work pursuant to provisions of the Contract Documents.
- D. For fill required to achieve subgrade elevations, use on-site soil or imported soil meeting the requirements of the Geotechnical Engineer for fill material. Condition, place, and compact this material to minimum 90% of maximum density to a level at least 9 inches below sand or aggregate base material. Compact remaining fill to bottom of sand or aggregate base material 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 Geotechnical Engineer 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 Geotechnical Engineer; surface shall be firm and unyielding. Address yielding or overwet / pumping subgrade areas as recommended by the Construction-Phase Geotechnical Engineer.
- I. Request observation and testing of finish subgrade condition by Construction-Phase Geotechnical Engineer and do not proceed with paving operations until subgrade condition has been approved.
- 3.03 FORMWORK
  - A. Verify lines, grades and dimensions and bring all discrepancies to the attention of the Architect / Engineer for resolution before proceeding with formwork.
  - B. Where it will not be exposed to view, foundation concrete may be placed directly into neat excavations (earth forms) provided the foundation trench walls are firm and stable, as determined

by the engineer and the geotechnical engineer, and such placement is approved by the Division of the State Architect and the Owner's Representative.

- C. Where earth forms are allowed to be used, cut excavations neatly and accurately to size for placement of concrete directly against the excavation and, except for bottom of footings, trim the excavation to allow for one inch of additional concrete beyond the dimensions or profiles shown on the Drawings. Hand trim sides and bottom of excavation, remove debris and loose soil, and construct formwork along each side of excavation at top to secure reinforcing and prevent sloughing; the minimum form work shown on the Drawings is mandatory to insure a clean excavation immediately prior to and during placement of concrete.
- D. Request observation and testing of Finish Subgrade condition by Construction Phase Geotechnical Engineer and do not proceed with placement of base material, form work, or reinforcing until subgrade condition has been approved.
- E. For concrete pavement, confirm that finish base course has been constructed to the design elevation, slope, and cross section within tolerances specified in Section 312000, Subsection 3.03B, pursuant to Section 015100 Field Engineering. Reconstruct and reconfirm as necessary for conformance before proceeding with placement of surfacing.
- F. Where called for, place base material and compact to minimum 95% density of maximum density. Request observation and testing and do not proceed with form work or reinforcing until thickness and compaction density of base material have been approved.
- G. Erect formwork, shoring and bracing to achieve design requirements, in accordance with Section 1906A, *California Building Code*.
  - 1. Remove old concrete which is set and dry from form boards.
  - 2. Provide bracing to ensure stability of formwork and shore or strengthen formwork subject to overstressing by construction loads.
  - 3. Arrange and assemble formwork, bracing, and shoring to permit dismantling and stripping without damage to concrete.
  - 4. Minimize the number of form joints; align joints and make watertight.
  - 5. Provide chamfer strips on external corners where called for on Detail Drawings.
  - 6. Layout joint spacing and mark on forms and request review by Owner's Representative.
- H. Protect staff, personnel and public from harm and accident during formwork. Conform to California Code of Regulations, Title 8, Subchapter 4, Construction Safety Orders.
- 3.04 POUR STOPS

- A. Construct separate concrete pours at all expansion joints and elsewhere as called for on the plans (pour stops). At least 48 hours shall separate concrete placement on each side of pour stop.
- B. At expansion joints serving as pour stops, edge of first pour shall be formed and speed dowel tubes installed. Expansion joint filler with removable joint cap shall serve as form for grade control and for tooling edge of second pour.

# 3.05 REINFORCEMENT

- A. Fabricate steel reinforcement in accordance with the Detail Drawings and Specifications. Where not detailed or specified, comply with the applicable requirements of Section 1907A of the *California Building Code* and the American Concrete Institute SP-66-88.
- B. Bend, cut, and place bars accurately. Bend bars cold at the mill; heating or field-bending of bars is not permitted. Do not bend or straighten bars in any manner that will damage the material.
- C. Place, support and secure reinforcement against displacement during pouring and consolidating concrete.
- D. Unless otherwise noted on Drawings, coverage for reinforcing bars (to face of bar) shall be as follows:
  - 1. Concrete in contact with earth, unformed:3"
  - 2. Concrete in contact with earth, formed: 2"
  - 3. Wall, exterior face, #5 bar and smaller:  $1 \frac{1}{2}$ "
  - 4. Wall, exterior face, #6 bar and larger: 2"
  - 5. Structural slab: <sup>3</sup>/<sub>4</sub>"

# 3.06 PLACING CONCRETE

- A. Construct concrete improvements in accordance with the Drawings, Detail Drawings, and Specifications.
- B. Prior to scheduling concrete pour:
  - 1. Have excavation, form work and reinforcement reviewed and accepted by Owner's Representative.
  - 2. Have joint layout, as marked on forms in advance, reviewed and accepted by Owner's Representative.
  - 3. Where required gutter gradient is less than 1.0% (1/8 inch per foot), have a Licensed Surveyor confirm form elevations prior to ordering concrete.

- 4. If there has been rainfall or other discharge of water to excavations after observation and testing pursuant to Paragraph 3.02F hereof, have subgrade re-reviewed and approved by Construction Phase Geotechnical Engineer.
- C. Notify Architect, Engineer, Structural Engineer, and Geotechnical Engineer / Testing Laboratory minimum 24 hours prior to commencement of concrete placement.
- D. PRIOR TO PLACING CONCRETE:
  - 1. Carefully review excavation, form work, and reinforcement. Remove wood chips, debris, and loose soil; take out temporary bracing and cleats, box openings for pipes; secure forms, reinforcement, anchors, and embedded items in their proper places.
  - 2. Dampen forms and sides and base of excavation against which concrete will be placed by spraying with clean water; apply water sufficient to dampen forms / excavation while not causing erosion or standing water.
  - 3. Before placing new concrete against hardened concrete and before placing masonry on concrete, remove all incrustations and laitance from forms, reinforcing, and surface of hardened concrete. If the surface mortar and laitance of the first concrete pour has not been completely removed by water blasting, sandblast the hardened concrete surface to expose the coarse aggregate to ¼ inch amplitude. Surfaces which are to receive drypack shall also be prepared as herein specified.

# E. HANDLING AND PLACING:

- 1. Once concrete placement has started, carry on as a continuous operation until the section of approved size and shape is completed.
- 2. Handle concrete as rapidly as practicable from the mixer to the place of final deposit by methods which prevent the separation or loss of ingredients. Deposit concrete as neatly as practicable, in its final position to avoid rehandling or flowing.
- 3. Concrete shall not be dropped freely where reinforcing will cause segregation, nor shall it be dropped freely more than 4 feet.
- 4. Maintain plastic surface approximately horizontal.
- 5. Do not deposit concrete that has partially hardened in the work. Do not retemper or use concrete after having stood 15 minutes after leaving the truck or mixer.
- 6. The total elapsed time between addition of water at the batch plant and complete discharge of the concrete load at the site shall not exceed 90 minutes.
- 7. Thoroughly vibrate all concrete within 15 minutes after placement.
- F. VIBRATING AND COMPACTING:
  - 1. Thoroughly consolidate concrete and compact by suitable means during the operation of placing and depositing. Thoroughly work concrete around reinforcement, embedded items, and into the corners of the forms. Thoroughly vibrate concrete adjacent to forms. Use internal vibrators under experienced supervision and keep out of contact with reinforcement and wood forms.

- 2. Vibrate close to the forms but do not continue at one spot to the extent that large areas of grout are formed or the heavier aggregates are caused to settle. Take care not to disturb concrete which has taken its initial set.
- 3.07 PROTECTION AND CURING
  - A. GENERAL: Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures, and maintain without drying at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.
  - B. INITIAL CURING: Initial curing shall immediately follow the finishing operation. Keep concrete continuously moist at least overnight. Use one of the following materials or methods:
    - 1. Ponding or continuous sprinkling.
    - 2. Use of curing compounds: Apply compounds in accordance with the manufacturer's recommendations. Do not use on surfaces against which additional concrete or other cementitious finishing materials are to be bonded or on surfaces on which such curing is prohibited by these specifications.
  - C. FINAL CURING: Immediately following the initial curing and before the concrete has dried, accomplish additional curing using one of the following materials or methods:
    - 1. Continuing the method used in initial curing.
    - 2. Waterproof paper covering.
    - 3. Other moisture-retaining coverings as approved.
  - D. DRILLING AND CORING: Drilling for anchors such as for skate stop devices and coring for post embedment shall not take place sooner than 28 days after placement of concrete.

### 3.08 WATERPROOFING

- A. Prepare the surface as recommended by the manufacturer of the waterproofing material.
- B. Apply the waterproofing to the limits identified on the Drawings and Detail Drawings in strict accordance with the manufacturer's recommendations.
- C. For brush-applied material, apply in two coats with delay between coats as recommended by the manufacturer; color of first coat shall be white and of second coat shall be gray.
- 3.09 EXISTING WORK
  - A. Overcutting is not allowed in sawcutting of existing concrete pavement and flatwork; at changes in direction, stop the saw short of an overcut and drill to make a smooth, clean corner.
  - B. Where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and set with epoxy grout.

- C. Prepare previously placed concrete by cleaning with steel brush and apply bonding agent in accordance with manufacturer's instructions.
- 3.10 COLORED WALKWAYS AND FLATWORK [IF CALLED FOR ON PLANS]
  - A. Conform to Architect's requirements for color, finish, and joint / scoreline pattern.
  - B. Construct a mockup for approval by Architect for each color required. Mockups shall contain an expansion joint, a control joint, and scorelines and shall be minimum of 10-feet long for walkways and minimum of 20-feet square for flatwork areas.
  - C. Do not construct permanent colored concrete improvements without approval of mockup by Architect. If approved, mockup may remain as part of permanent work, provided it also conforms to all dimensional, structural, and geotechnical requirements.
- 3.11 CONCRETE FINISHES
  - A. FORMED SURFACES: smooth finish.
  - B. SIDEWALKS, RAMPS, EXTERIOR SLABS, PAVEMENTS: Non-slip surface finish shall be provided at all walk areas using a broom finish transverse to path of travel; medium broom (medium salt) where surface slope is less than 6%, heavy broom (slip resistant) where surface slope is 6% or greater, conforming to CBC Section 11B-302. Finishes shall be uniform throughout project.
  - C. WATERPROOFING:
    - 1. Where waterproofing is called for on the Drawings, apply it in accordance with the manufacturer's instructions in two coats; apply the second coat at right angles to the first.
    - 2. Mask the interface line along finish grade to prevent application of waterproofing above grade.
- 3.12 JOINTS: CURB, CURB & GUTTER, GUTTER, WALK, RAMP
  - A. CRACK CONTROL JOINTS
    - 1. Construct joints during the finishing operation in accordance with the Detail Drawings and these specifications.
    - Construct transverse Crack Control Joints (deep-tooled weakened-plane joints) at regular intervals not exceeding 10-feet, directly above drain pipes which outlet through curb, and at locations called for on the Drawings or by the Owner's Representative. Longitudinal reinforcement shall be continuous through joint.
    - 3. Construct joints as follows: after preliminary troweling, part the concrete to a depth of 2 inches with a straightedge to create a division in the coarse aggregate. Then refloat the concrete to fill the parted joint with mortar. Mark the form headers to locate the weakened plane for final joint finishing, which shall be accomplished with a jointer tool having a depth

of  $\frac{1}{2}$  inch and a radius of  $\frac{1}{8}$  inch. The finished joint opening shall not be wider than  $\frac{1}{8}$  inch.

## B. EXPANSION JOINTS

- 1. Construct transverse Expansion Joints at BCR, ECR, and at regular intervals not exceeding 40-feet. Construct additional expansion joints along edges of driveways and fixed objects and structures (fire hydrant, light standard, utility pole, drain inlet, manhole or valve cover, screen/retaining wall, building wall, etc.) and at locations called for on the Drawings or by the Owner's Representative. Do not construct Expansion Joints in cross or valley gutter which is separate from curb. Construct joints in accordance with the Detail Drawings and these Specifications.
- 2. Construct expansion joints <sup>3</sup>/<sub>8</sub>-inch wide with one piece of preformed joint filler installed from bottom of slab to within <sup>5</sup>/<sub>8</sub>-inch of concrete surface; install a <sup>3</sup>/<sub>8</sub>-inch deep removable joint cap on the filler with the top of cap <sup>1</sup>/<sub>4</sub>-inch below concrete surface; fill resulting reservoir with joint sealant to within <sup>1</sup>/<sub>4</sub>-inch of concrete surface as soon after completion of the curing period as is possible. Joints shall be cleaned of all foreign material, including membrane curing compounds and all of the removable portion of the joint cap, and shall be surface-dry when sealer is installed.
- 3. Interrupt longitudinal reinforcing bars 3 inches clear of expansion joints and install minimum 16-inch long smooth dowels across, and centered on, the joint. Install one-half (one end) of dowel within a "Speed Dowel" tube; provide a 1-inch gap between the end of the dowel and the sealed end of the tube. For walks, ramps and flatwork, install 5/8" dowels centered vertically in slab and centered horizontally between each pair of longitudinal rebar. For curbs and curb and gutters, install <sup>3</sup>/<sub>4</sub>" dowels centered between pairs of longitudinal rebar, horizontal and vertical (1 dowel for curb, 2 dowels for curb and gutter). Omit smooth dowels at BCR and ECR when curb radius is less than 5 feet.
- C. Adjust joint spacing as necessary to align with those already constructed in existing adjacent (contiguous) features.
- D. Along curves and through walk returns, joints shall be radial.
- 3.13 JOINTS: CONCRETE PAVEMENT
  - A. CRACK CONTROL JOINTS
    - Construct joints by sawcutting grooves as soon as concrete has hardened sufficiently to support the saw and the saw will not dislodge the concrete, but before six (6) hours after finishing of the concrete. An early entry saw such as the "Soff-Cut" saw by Soff-Cut International (800) 776-3328 is recommended.
    - 2. Construct transverse and longitudinal Crack Control Joints (Contraction Joints) at regular intervals not exceeding 10-foot maximum spacing each way and at additional locations called for on the Drawings or by the Owner's Representative. Construct joints in

accordance with the Detail Drawings and these Specifications. Width of joints shall be  $\frac{1}{4}$ -inch, depth shall be 2 inches.

- 3. Fill sawcut joints with joint sealant to within ¼" of concrete surface as soon after completion of the curing period as is feasible and before pavement is opened to traffic. Joints shall be cleaned of all foreign material, including membrane curing compound, and shall be surfacedry when sealer is installed.
- B. EXPANSION JOINTS
  - 1. Construct Expansion Joints at locations called for on the Drawings or by the Owner's Representative. Construct joints in accordance with the Detail Drawings and these Specifications.
  - 2. Construct expansion joints ½-inch wide with one piece of preformed joint filler installed from bottom of slab to within 1½" of concrete surface; fill resulting reservoir with backer rod and joint sealant to within ¼" of concrete surface as soon after completion of the curing period as is feasible and before pavement is opened to traffic. Joints shall be cleaned of all foreign material, including membrane curing compound, and shall be surface-dry when sealer is installed.
  - 3. Interrupt reinforcing bars 3 inches clear of expansion joints and install minimum 18-inch long smooth dowels across, and centered on, the joint. Dowel diameter shall be 1 inch for 8 inch thickened slab, 1 ¼ inches for 10 inch thickened slab. Install one-half (one end) of dowel within a "Speed Dowel" tube; provide a 1-inch gap between the end of the dowel and the sealed end of the tube. Install dowels centered vertically in the thickened slab and centered horizontally between each pair of longitudinal rebar.
- C. Adjust joint spacing as necessary to align with those already constructed in existing adjacent (contiguous) curb, gutter, and sidewalk.
- D. Along curves, joints shall be radial.
- 3.14 REINFORCING STEEL
  - A. Install reinforcing steel in concrete improvements in accordance with the Detail Drawings.
  - B. Install reinforcing steel continuous through construction joints with a minimum 24-inch lap.
  - C. Interrupt reinforcing steel at expansion joints and construct dowels across joints in accordance with Paragraphs 3.12-B and 3.13-B of this Section and the Detail Drawings.
- 3.15 ADJUSTING STRUCTURES
  - A. Carefully adjust the perimeter edge of valve box, utility vault, and manhole frames and covers to conform with finish pavement surface.

# 3.16 SIGN POSTS

A. Where sign post is to be installed in concrete pavement or walkway, accurately locate post and construct footing per the Detail Drawing monolithically with pavement or walkway. After concrete has cured, core drill and install sign post per the Detail Drawing.

# 3.17 FIELD QUALITY CONTROL

- A. Request inspection by Owner's Representative after forming and placing reinforcing steel and after marking joint / scoreline locations on forms but prior to scheduling the concrete pour. Provide at least 24-hours advance notice.
- B. The total elapsed time between addition of water at the batch plant and complete discharge of the concrete load at the site shall not exceed 90 minutes.

Thoroughly vibrate all concrete within 15 minutes after placement.

- C. Overcutting is not allowed in sawcutting of existing concrete pavement and flatwork; the saw shall be stopped short of an overcut and the remainder of the cut constructed by drilling, to make a smooth, clean corner.
- D. Survey forms for concrete walks and ramps prior to ordering concrete to insure that accessibility requirements for slope and cross-slope will be conformed with.
- E. Where design longitudinal gradient is less than 1% (1/8 inch per foot) survey gutter or curb and gutter forms prior to ordering concrete to ensure that design slope is being achieved.
- F. ACCEPTABLE TOLERANCES:
  - 1. Formed concrete features shall not vary more than 1/4 inch (0.02 foot) from design dimension (height, width or length) at any location.
  - 2. Formed concrete features shall not vary more than 1/4 inch (0.02 foot) from design line or grade at any location or along any 10' length.
  - 3. The faces of curbs and walls shall not vary more than 1/4 inch (0.02 foot) above or below the surface plane called for by the Drawings and Detail Drawings.
  - 4. The surface of concrete walks, ramps, and pavements shall be finished true to grade and cross section and shall be free of any unevenness greater than 1/4 inch (0.02 foot) when checked with a 10-foot long straight edge placed on the surface.
  - 5. In no case shall water pond in gutters or on concrete walks, pavement and flatwork. Ponded water is defined as that which covers a 5 cent piece after area is flooded and allowed to drain for one hour at 70° F or warmer.
  - 6. In no case shall maximum accessible slopes or cross-slopes be exceeded.

7. Path of Travel Technical Requirements For Accessible Route: Accessible Path of Travel as indicated on plan is a barrier-free access route without abrupt level changes exceeding ½" if beveled at 1:2 maximum slope or vertical level changes not exceeding ¼" maximum and at least 48" in width. Surface is stable, firm, and slip-resistant. Cross-slope shall not be steeper than 1:48 and slope in the direction of travel shall not be steeper than 1:20. Architect shall verify that there are no barriers in the Path of Travel.

## 3.18 FLOOD TEST

- A. After construction of concrete site improvements including walks, steps, ramps, flatwork, pavement and gutters, conduct a flood test to review surface drainage, as follows:
  - Supply and discharge water in sufficient quantity to completely wet and cover all site concrete surfaces including gutter areas and allow to drain/dry for one hour at 70° F or warmer. Mark the outline limits of residual standing water deep enough to cover a 5 cent piece with non-permanent marking crayon.
  - 2. Remove and replace site concrete improvements at no additional cost to the Owner, as necessary to provide positive surface drainage and to prevent ponding of water on surfaces and in gutters; removal and replacement shall be to the closest joint each way limits of from ponding.
  - 3. Conduct additional flood testing to confirm success of corrective measures.

# 3.19 DEFECTIVE WORK

A. Defective concrete work shall be removed and replaced at Contractor's expense.

Section continues on next page.

# 3.20 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 [Contractor is to acknowledge with initials each submittal included] <u>Initials:</u>

- \_\_\_\_\_ Letter of explanation attached for each submittal not included.
- \_\_\_\_\_ All submitted products are as specified.
- B. SUBMITTAL SCHEDULE
  - 1. Product Information
    - a. Submit concrete mix design for each class of concrete required.
      - b. Submit laboratory test results for all aggregate sources which confirm conformance with Paragraph 2.04 hereof.
  - c. Submit laboratory test results for aggregate base which confirm conformance with grading and quality requirements of Section 200-2.2 of the SSPWC.
  - d. Submit sieve analysis and Sand Equivalent value for sand base.
  - e. Submit mill affidavits stating the grades and physical and chemical properties of the reinforcing steel and conformance with ASTM Specifications.
  - f. Submit manufacturer's product data for joint filler, backer rod, and sealant, for epoxy grout, for waterproofing, for curing compound.
  - \_\_\_\_\_ g. Submit manufacturer's product data for abrasive stair nosing.
  - \_\_\_\_\_ h. Submit manufacturer's product data for non-slip paint for warning strips.
    - i. Submit manufacturer's product data for skateboard deterrent devices.
    - j. Submit manufacturer's product data for precast concrete detectable warning pavers.
  - 2. Shop Drawings
    - a. Prepare and submit shop drawings, drawn to scale, showing an elevation view of all retaining structures and detailing the locations of structure joints and form joints and snap tie layout.
    - b. Prepare and submit shop drawings, drawn to scale, detailing locations of skateboard deterrent devices.

END OF SECTION

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# SECTION 321314 - SITE CONCRETE REINFORCEMENT

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. Provide materials, equipment and transportation and perform labor as required for supplying reinforcing steel for cast-in-place concrete pavement, curbs, gutters, walkways, ramps, drainage structures, retaining structures, post footings.
- B. This work does not include concrete reinforcement associated with the building(s).

#### 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 321313: Site Concrete
- 1.04 REFERENCE SPECIFICATIONS
  - A. ACI SP 66 Detailing Manual
  - B. ACI 318 Building Code Requirements for Reinforced Concrete
  - C. ASTM A 82 Steel Wire, Plain, for Concrete Reinforcement
  - D. ASTM A 615 Deformed and Plain Billet-steel for Concrete Reinforcement
  - E. CRSI MSP-1 Manual of Standard Practice
  - F. California Building Code, Chapter 19, Concrete
- 1.05 REGULATORY REQUIREMENTS
  - A. Construction shall comply with the *California Code of Regulations, Title 24, Part 2* (the *California Building Code*), most recent effective edition.
- 1.06 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.

# 1.07 RECORD DOCUMENTS

- A. Comply with requirements of Division 1, "Project Record Documents" section, and following:
  - 1. Accurately record changes in construction from that called for on the Drawings and Specifications for Record Documents.
- 1.08 QUALITY ASSURANCE
  - A. All reinforcing shall be fabricated from steel manufactured in the United States.
  - B. Specified reinforcing bars shall be supplied from single sources only.

#### 1.09 TESTS

- A. Testing and analysis of reinforcing steel will be performed under provisions of Division 1, "Testing and Inspection" section.
- 1.10 DELIVERY, HANDLING AND STORAGE
  - A. DELIVERY:
    - 1. Deliver bars new and free from rust and mill scale in original bundles tagged to identify placement and certify testing.
    - 2. If reinforcement arrives at the site without tags or certificates, testing by the Owner's testing laboratory will be required in accordance with Division 1, "Testing and Inspection" section or such reinforcement will not be accepted for incorporation into the Project; Contractor shall reimburse the Owner for the costs of such tests.

## B. HANDLING AND STORAGE

- 1. Transport reinforcing steel to the construction site; store and cover it in a manner which will ensure that no damage occurs from moisture, dirt, grease, or other cause that might impair bond to concrete.
- 2. Store a sufficient supply of approved reinforcing steel on the construction site at all times to ensure that there will be no delay in construction.
- 3. Maintain identification of steel after bundles are broken.

#### 1.11 COORDINATION

A. Review architectural, structural, and civil drawings for anchor bolt schedules and for locations of anchors, inserts, conduits, sleeves, and other items which are required to be cast in concrete,

and make necessary provisions as required so that reinforcing steel will not interfere with the placement of such embedded items.

### PART 2 - MATERIALS

- 2.01 REINFORCING BARS: New, deformed billet-steel bars, complying with ASTM A-615, grades as indicated on the drawings.
- 2.02 ACCESSORIES: Provide reinforcement accessories, consisting of spacers, chairs, ties, and similar items as required for spacing, assembling, and supporting reinforcement in place. Provide accessories fabricated from galvanized steel or approved plastic material, conforming to the applicable requirements of CRSI MSP-1.
- 2.03 TIRE WIRE: Galvanized steel wire conforming to ASTM A-82, except black steel may be used for concealed concrete work; 16 gauge, except heavier where indicated on the Drawings. Tie wire shall not protrude from concrete.
- PART 3 EXECUTION
- 3.01 FABRICATION
  - A. Fabricate steel reinforcement in accordance with the details indicated. Where specific details are not indicted or noted, comply with the applicable requirements of CBC, Chapter 19, and ACI SP-66.
  - B. Bend, cut, and replace bars accurately, as indicated. Bend bars cold at the mill; heating or field bending of bars is not permitted. Do not bend or straighten bars in any manner that will injure the material. Bars that have been heated for bending, bars with kinks or bends not indicated on the Drawings, and bars damaged by bending or straightening shall be removed and new reinforcement shall be provided.
- 3.02 PLACING
  - A. GENERAL: Place reinforcing steel in accordance with the Drawings and the applicable requirements of CRSI MSP-1 and ACI 318. Install reinforcement accurately and secure against movement, particularly under the weight of workmen and the placement of concrete.
  - B. REINFORCING SUPPORTS: Support bars on metal chairs or spacers on metal hangers, accurately placed and securely fastened to steel reinforcement in place. Support legs of accessories in forms without embedding in form surface. Space chairs and accessories in conformance with CRSI MSP-1. No wood will be permitted inside forms. Precast concrete cubes may be used to support reinforcing for footings and slabs on grade only.

- C. PLACING AND TYING: Set reinforcing in place, space, and securely tie at splices and at crossing points and intersections in the position indicated, or as directed. Point ends of wire away from forms.
- D. SPACING: Space bars as indicated. Where not indicated, the clear spacing for main longitudinal column reinforcement shall be not less than 1.5 times the nominal bar diameter, or 1-1/2 inches, or 1-1/3 times the maximum size aggregate, whichever is greater. For other parallel bars, where spacing is not indicated, the minimum clear spacing shall not be less than the nominal bar diameter, or one inch, or 1-1/3 times the maximum size aggregate, whichever is less. The clear distance limitations above also apply between the bars being spliced at a contact lap splice and adjacent bars.
- E. SPLICES: Except for temperature bars in slabs and horizontal wall reinforcing, no splicing will be allowed for reinforcing bars unless detailed locations are indicated, or approval is given. Wherever possible, stagger splices of adjacent bars.
  - 1. Lapped splices shall not be used for bars larger than No. 11. Stagger lapped splices for horizontal wall reinforcing and slab temperature bars by the required lap splice length minimum.
  - 2. Welding of reinforcing steel will not be permitted.
  - Make mechanical butt splices in accordance with the splicing device manufacturer's recommendations. Mechanical splices shall develop 125 percent of the specified minimum yield tensile strength of the spliced bars.
- F. DOWELS: Securely tie dowels in place before concrete is deposited. In the event there are no bars in position to which dowels may be tied, add a No. 3 minimum to provide proper support and anchorage. Bending of dowels after placement of concrete will not be permitted. Protect dowels extended for future construction from weather exposure. Strictly comply with safety law requirements for extended dowels.
- G. CLEANING: At time of concrete placement, reinforcement shall be clean and free of coatings that would impair bond to concrete; otherwise, clean reinforcing by sandblasting.
- H. Daylighting of tie wires is not permitted, no exception.
- 3.03 FIELD QUALITY CONTROL
  - A. Notify the District Inspector at least 5 working days ahead of each concrete placement and do not place any concrete until all reinforcing steel has been installed and has been approved by the Inspector. Complete all reinforcing in every way by the end of the working day which precedes concrete placement. Reinforcement not placed in accordance with the Drawings shall be removed and replaced.
  - B. Testing and inspections are specified in Division 1, "Testing and Inspection" section.

## 3.04 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 [Contractor is to acknowledge with initials each submittal included] Initials:\_\_\_\_\_

\_\_\_\_\_ Letter of explanation attached for each submittal not included.

\_ All submitted products are as specified.

- B. SUBMITTAL SCHEDULE
  - 1. Product Information
  - a. Submit Certified Mill Test Reports for the reinforcing bars being provided that states the strength grade(s) and A.S.T.M. Standards to which the bars have been fabricated and that the steel used in fabrication was manufactured in the United States.
  - 2. Shop Drawings
  - a. Prepare and submit placement drawings showing the size, locations and spacing of reinforcing in the various parts of the structure, with details as required, in accordance with ACI SP-66. Placement drawings shall be complete so that placement of the reinforcing may proceed without reference to the design drawings. Do not submit cutting and bending lists.

END OF SECTION

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# SECTION 321723 - PAINTED PAVEMENT MARKINGS

PART 1 – GENERAL

- 1.01 DESCRIPTION
  - A. Provide materials, equipment and transportation and perform labor as required for construction of painted pavement markings including, but not limited to: documenting characteristics and locations of existing pavement and curb markings, cleaning pavements and curbs, constructing painted markings.
- 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 321216: Asphalt Concrete Paving
- 1.04 REFERENCE SPECIFICATIONS / REFERENCE DETAILS
  - A. 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).
  - B. In case of conflict between Reference Specifications/ Details and these Project Specifications / Details, the more stringent provision shall govern, as determined by the Architect and Engineer.
- 1.05 GENERAL REQUIREMENTS
  - A. Contractor shall employ a licensed surveyor to provide basic layout control for striping, including:
    - 1. Begin and end of each parking lot bay.
    - 2. For angled parking, each end of stall stripe at least at each end of parking lot bay.
    - 3. Each corner of square or rectangular recreational courts.
    - 4. Radius points for curved stripes having radius less than 30 feet; points at 20' spacing for stripes having longer radii.
  - B. For pavement rehabilitation work where plans call for existing pavement markings to be replaced in kind (parking lots or recreational areas), compile an accurately dimensioned record drawing which documents the following information in advance of damage to existing pavements:

- 1. layout and characteristics of existing lane lines and parking stall and access isle striping or recreational court lines, including: length, width and color of lines; degree of angled parking; width of lanes, stalls, bays and isles; dimensions of recreational courts.
- 2. location and size of parking stall designation legends and of recreational area legends.
- 3. location, type and size of directional arrows.
- 4. colors and limits of painted curbs and curb legends.
- 5. locations of limit lines and STOP legends.
- 6. locations and characteristics of other pavement legends, markings and delineation.
- 7. locations and color of speed bumps.
- 1.06 REGULATORY REQUIREMENTS
  - A. Painting of accessible parking spaces and access isles shall comply with the *California Code of Regulations, Title 24, Part 2* (the *California Building Code*), most recent effective edition, and with provisions of the Americans with Disabilities 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 RECORD DOCUMENTS
  - A. Comply with requirements of Division 1, "Project Record Documents" section.
- 1.09 WARRANTY
  - A. Provide minimum 5 year warranty per D.S.A. Bulletin 10/01/02, revised 9/27/04.
- PART 2 MATERIALS
- 2.01 PAINT
  - A. Paint for pavement striping and marking shall be water-borne conforming to Section 84-3 of the Caltrans Standard Specifications.

- B. Traffic paint to include an evenly dispersed, fine-aggregate additive. Striping and pavement marking to be textured, slip-resistant coating, complying with 11B-302.1 and 2018 Caltrans Standard Specifications 84-2.
- 2.02 PAINT COLORS
  - A. Paint colors shall be Traffic White, Traffic Yellow, Traffic Red, Accessible Blue, or Green, as applicable to the Drawings; Accessible Blue shall be color No. 15090 in Federal Standard 595C.
    - 1. In general, color uses are as follows:
      - a. Limit line and STOP legend: white.
      - b. Disabled parking stall and access isle stripes: blue.
      - c. Disabled parking legends: white.
      - d. Standard parking stall, island and access isle stripes: yellow.
      - e. Traffic lane lines: yellow or white.
      - f. Pavement markings and legends: yellow.
      - g. Fire Lane No Parking lines and legends: red.
      - h. No Stopping curb: red.
      - i. Drop-off curb: white.
      - j. Disabled Parking and Drop-off curb: blue.
      - k. Recreational courts: yellow, blue, red, green.

# 2.03 LINE WIDTHS

- A. Parking lot lane, stall and islands: 4"-wide.
- B. Recreational court stripes: 2"-wide, unless otherwise noted on plans.
- C. Diagonal stripes for parking lot islands and access isles shall be at 5' spacing, center to center, except for accessible parking isles which shall have diagonal lines at 3' spacing, center to center.
- D. Limit line: 12"-wide.
- E. Tolerances

- 1. Line lengths and widths plus or minus  $\frac{1}{4}$  inch on straight segments and plus or minus  $\frac{1}{2}$  inch on curved alignments.
- 2.04 PAVEMENT MARKING SIZES
  - A. Pavement use legends: 12 inches tall.
  - B. STOP legend: 8 feet tall.
- 2.05 PAVEMENT MARKINGS FOR THE DISABLED
  - A. Painted lines and markings on pavements shall be 4" wide. When blue color is used, it shall be equal to color No. 15090 per Federal Standard 595C.
  - B. Parking spaces for the disabled shall be marked according to CBC Sections 11B-502.3.
  - C. Tactile warning devices shall be conformance with CBC Section 11B-247.1 and Section 321313 of these Specifications.
  - D. Special warnings for disabled persons shall comply with CBC Sections 11B-247.1 / ADA Standards.
  - E. Provide minimum 5 year warranty per DSA Bulletin 10/01/02, revised 9/27/04.

### PART 3 – EXECUTION

### 3.01 LIMITATIONS

- A. Apply paint only to clean and dry surfaces, during favorable weather conditions, and when damage from precipitation, irrigation and traffic is not anticipated over the drying period.
- B. Apply paint only when temperature is above 50 degrees F during the drying period.
- C. Allow new pavement or seal coat to cure for 7 days minimum before applying paint.
- D. Allow first coat of paint to cure for 24 hours minimum before applying second coat.
- 3.02 PREPARATION
  - A. Surfaces to be painted shall be dry and free of grease and loose dirt particles. Scrape and wire brush chipped or damaged paint on existing curbs. High pressure wash all curbs to be painted. Sweep and otherwise clean pavement as necessary to eliminate loose dust and other material before applying paint.
  - B. Perform layout with chalk or lumber crayon only. Cat-track centerline and lane stripes for review by Owner's Representative prior to painting stripes.
# 3.03 APPLICATION

- A. Apply paint with mechanical equipment to produce uniform straight edges using equipment and templates specifically designed for this purpose.
- B. Apply all paint in two (2) coats with 24-hours minimum between coats.
  - 1. Each coat shall include two (2) complete passes with a coverage of not less than 1 gallon per 150 square feet.
  - 2. The paint application shall result in a uniform color and texture and shall completely cover and block-out the underlying surface; apply additional paint as necessary to achieve this result.
  - 3. The second coat after 24 hours may be waived by the owner, in the owner's sole discretion, based on a satisfactory results from first paint coat and cost credit offered by contractor.

### 3.04 CLEANING UP

- A. Remove drips, overspray, improper markings, and paint material tracked by traffic by sand blasting, wire brushing, or other method approved by Architect and Engineer.
- B. Incorrect or conflicting markings shall be removed by sand blasting, wire brushing or grinding. If surface is damaged, repair surface by heating, tack coating and placing asphalt concrete fines. No paint blackout allowed.

# 3.05 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 [Contractor is to acknowledge with initials each submittal included] Initials:

- Letter of explanation attached for each submittal not included.
- \_\_\_\_\_ All submitted products are as specified.

# B. SUBMITTAL SCHEDULE

- 1. Submit manufacturer's product data for paint which confirms conformance with Section 84-3 of the Caltrans Standards.
- 2. Submit record striping plan pursuant to Paragraph 1.05A of this Section, if applicable.
- 3. Submit color sample for green paint.

END OF SECTION

# **SECTION 32 3113 - CHAIN LINK FENCES**

PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Chain-link fences.
- B. Related Requirements:
  - 1. Section 32 3113 "Site Concrete" for cast-in-place concrete post footings.

### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
    - a. Fence and gate posts, rails, and fittings.
    - b. Chain-link fabric, reinforcements, and attachments.
- B. Shop Drawings: For each type of fence and gate assembly.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Include accessories and hardware.

#### 1.3 FIELD 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.

### 1.4 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to comply with performance requirements.

- b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- 2. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.
  - 1. Design Wind Load: 92 Vmph per ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2.
    - a. Minimum Post Size and Maximum Spacing: Determine according to CLFMI WLG 2445, based on mesh size and pattern specified.

### 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 according to "CLFMI Product Manual" and requirements indicated below:
  - 1. Fabric Height: 6 feet.
  - 2. Steel Wire for Fabric: Wire diameter of 0.120 inch (11 gauge).
    - a. Mesh Size: 1-3/4 inches.
    - b. Zinc-Coated Fabric: ASTM A392, Type II, Class 2, 2.0 oz./sq. ft. with zinc coating applied after weaving.
  - 3. Selvage: Knuckled at both selvages.

# 2.3 FENCE FRAMEWORK

- A. Posts and Rails: ASTM F1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F1043 based on the following:
  - 1. Fence Height: 72 inches.
  - 2. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40.
    - a. Line Post: 2.375 inches in diameter.
    - b. End, Corner, and Pull Posts: 2.875 inches in diameter.

- 3. Horizontal Framework Members: top and bottom rails according to ASTM F1043.
  - a. Top Rail: 1.66 inches in diameter.
- 4. Brace Rails: ASTM F1043.
- 5. Metallic Coating for Steel Framework:
  - a. Type A: Not less than minimum 2.0-oz./sq. ft. average zinc coating according to ASTM A123/A123M or 4.0-oz./sq. ft. zinc coating according to ASTM A653/A653M.

# 2.4 FITTINGS

- A. Provide fittings according to ASTM F626.
- B. Post Caps: Provide for each post.
  - 1. Provide line post caps with loop to receive tension wire or top rail.
- C. Rail and Brace Ends: For 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 bottom rails to 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 F626.
  - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to 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. of zinc.

# 2.5 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with 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.

# PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
  - 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. 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 CHAIN-LINK FENCE INSTALLATION

- A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- C. 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 to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
    - a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.

- D. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment of 30 degrees or more. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.
- E. Line Posts: Space line posts uniformly at 96 inches o.c.
- F. Post Bracing and Intermediate Rails: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
  - 1. Locate horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail, and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- G. Top Rail: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. 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. Chain-Link Fabric: Apply fabric to inside of enclosing framework. Leave 1-inch bottom clearance between finish grade or surface and bottom selvage 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.
- I. 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.
- J. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F626. 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.
- K. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

END OF SECTION 32 3113

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# SECTION 334100 - STORM DRAINAGE PIPING

# PART 1 - GENERAL

# 1.01 SUMMARY

- A. Includes materials, equipment, transportation and labor as required to:
  - 1. Make exploratory investigations, excavations and surveys as necessary to ascertain locations and physical characteristics of existing buried pipelines and conduits within work area and
  - 2. Construct storm drainage piping and fittings.

### 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 312300: Trenching and Backfilling
- B. Section 312500: Construction Storm Water Pollution Prevention
- C. Section 334900: Storm Drainage Structures

# 1.04 STANDARD SPECIFICATIONS

- A. Construction materials and methods shall be in accordance with the *Standard Specifications for Public Works Construction,* 2021 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 / REFERENCE DETAILS

- A. Materials shall conform to the applicable requirements of American Society for Testing and Materials (ASTM) Standards, American Water Works Association (AWWA) Standards and American National Standards Institute (ANSI) Standards, latest editions.
- B. Polyvinyl chloride (PVC) storm drain construction shall be in accordance with the *Handbook of PVC Pipe*, latest edition, published by the Uni-Bell Plastic Pipe Association.

- C. Where called for on the Drawings or in these Specifications, construction materials and methods shall be in accordance with *City of Santa Barbara Public Works Department Construction Standard Details* dated November 2012.
- D. 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.
- E. In case of conflict between the Standard Specifications and Reference Specifications, the Reference Specifications shall govern.
- F. In case of conflict between Reference Specifications / Details and the project specifications / details, the more stringent provision shall govern, as determined by the Architect and the 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.

# 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 RECORD DOCUMENTS

- A. Comply with requirements of Division 1, "Project Record Documents" section, and following:
  - 1. Accurately record location of catch basins, junction structures, piping, bends, connections, and appurtenant structures, including top-of-grate and pipe/structure invert elevations, 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 utilities, for Record Documents.

# PART 2 - MATERIALS

# 2.01 STORM DRAIN PIPE AND FITTINGS

A. POLYVINYL CHLORIDE (PVC), ASTM D 3034

- Pipe and fittings shall be Type PSM Poly-vinyl Chloride (PVC) with integrally molded bell and spigot for gasketed joint assembly, conforming to the most recent issue of ASTM Standard D-3034 (SDR 35) for 4" through 15" size and ASTM F-679 (Wall Thickness T-1) for 18" through 27" size, unless otherwise called for on the Drawings.
- 2. Joints shall comply with the most recent issue of ASTM Standard D-3212 with gaskets conforming to the most recent issue of ASTM Standard F-477.
- B. POLYVINYL CHLORIDE (PVC), AWWA A C-900
  - 1. Pipe and fittings for 4" through 12" size shall be Polyvinyl Chloride (PVC) Class 200, DR-14, cast iron pipe size, with integrally molded bell and spigot for gasketed joint assembly, meeting requirements of the most recent issue of ASTM Specification D-2241 and AWWA Standard C-900.
- C. DUCTILE IRON
  - 1. Ductile iron pipe (D.I.P.) shall be Pressure Class 350, with push-on joint ends, conforming to the most recent issue of AWWA Standard C-151.

Fittings shall be cast or ductile iron conforming to the most recent issue of AWWA Standards C-110 or C-153.

- 2. Ductile iron pipe and fittings shall be lined with cement mortar sealed with a bituminous coating in accordance with the most recent issue of AWWA Standard C-104. The exterior surface of all fittings to be buried shall be coated with a 1-mil thick bituminous coating in accordance with the most recent issue of ANSI Standard A21.6. Lining and coating shall be at the place of manufacture.
- 3. Buried ductile iron pipe shall be encased during installation with polyethylene in accordance with the most recent issue of AWWA Standard C-105. Polyethylene film shall have a nominal thickness of 0.998 inches (8 mil).
- D. RECTANGULAR CAST IRON PIPE
  - Rectangular cast iron pipe (C.I.P.) shall be No. A-470 as manufactured by Alhambra Foundry Company, Ltd., or equivalent, with bell and spigot ends and 5'-0" laying length.
  - 2. Cast iron adapters for transition from round to rectangular pipe shall be Alhambra Foundry No. A-480, or equivalent.
- E. REINFORCED CONCRETE PIPE
  - 1. Reinforced concrete pipe (RCP) shall conform with the most recent issue of ASTM Standard C-76 for strength Class III (1350-D) minimum.

- 2. Joints shall be tongue and groove type to be fully mortared, inside and out, during installation.
- F. HIGH DENSITY POLYETHYLENE (HDPE) PIPE, GASKETED JOINTS
  - 1. HDPE pipe and fittings for 4" through 48" size shall be N-12 Prolink WT (watertight) series as manufactured by Advanced Drainage Systems, Inc. (ADS).
  - 2. Lateral connections to HDPE mainlines shall be made using manufacturer's Watertight Series 35 thermo-molded PVC reducing wye fittings.
  - Connections to concrete structures shall be made using manufacturer's Watertight Series thermo-molded PVC coupling cast into structure wall with waterstop at midpoint of wall.
  - 4. Pipe and fitting shipping, handling and installation shall be in accordance with the manufacturer's recommended procedures.

# 2.02 SUBDRAIN PIPE AND FITTINGS

- A. Pipe and fittings 4" and 6" size shall be Poly-Vinyl Chloride (PVC) conforming to the most recent issue of ASTM D-1785 (SCH 40) assembled using solvent weld joints.
- B. Perforations shall be  $\frac{1}{2}$  diameter and shall be in two rows parallel with the pipe axis and 120° apart (60° above the pipe invert on each side).
- C. Solvent cement shall comply with ASTM D-2564.
- D. Perforated pipe shall be full encapsulated within a filter sock having an E.O.S. of 70 or less.

# PART 3 - EXECUTION

# 3.01 GENERAL REQUIREMENTS

- A. Schedule gravity pipeline construction ahead of other underground conduit construction.
- B. Before beginning work, determine or verify the location and flowline elevation of all existing drainage structures and pipes to be joined by new construction.
- C. Before beginning work, determine or verify the location and depth of all existing structures, pipes, or conduits which cross or otherwise may conflict with new construction.
- D. 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.

- E. Employ a Licensed Surveyor to provide line and grade control stakes for construction of storm drain facilities, to survey locations of existing facilities to be joined by or which may interfere with new construction, and to provide conformation during construction that facilities are at required line and grade.
- F. Begin gravity pipeline construction at the lowest point of discharge and proceed in the upgrade direction with the pipe bell end pointing upgrade.

### 3.02 EXPLORATORY INVESTIGATION, EXCAVATION AND SURVEYING

- A. LOCATING AND MARKING FACILITIES
  - 1. Before beginning trenching or other excavation, investigate and determine the locations of all existing utilities that are included in the work area, or which may be affected by the work, and mark these locations at the site with paint or flags. Utilities shall mean water, sewer, storm drain, gas, electrical power, and data and voice communication piping or conduits and wiring, and appurtenances.
- B. EXPOSING BURIED FACILITIES
  - 1. For existing buried piping, conduits, and structures to be joined by proposed construction, or which may cross or otherwise interfere with proposed construction, excavate to expose said facilities for purpose of determining exact location, configuration, type, and size. Exercise care to avoid damage to facilities which are to remain in service.

# C. SURVEYING EXPOSED FACILITIES

- 1. Pursuant to Paragraph 3.02-B hereof, employ a Licensed Land Surveyor to determine horizontal and vertical locations of existing buried piping, conduits and structures to be joined by new construction or which cross or may otherwise interfere with proposed construction and provide this information to Engineer for review. Allow at least five working days for review. More time may be required depending on completeness of information provided and on extent of conflicts, if any.
- 2. Before beginning trenching for a proposed storm drain which will be constructed with less than 10-foot clear separation from an existing or proposed potable water mainline, determine by survey that the storm drain will have a clear separation of at least 4 feet horizontally from, and at least 1 foot vertically below, the water main.

# 3.03 EXCAVATION EXAMINATION

- A. Verify that excavation dimensions and elevations are as indicated on the Drawings, including due allowance for required thickness of bedding material, and that the excavation is ready to receive storm drainage structure and/or pipeline work.
- B. Verify that excavation finish subgrade condition has been reviewed and approved by the Construction-Phase Geotechnical Engineer.

### 3.04 EXCAVATION PREPARATION

A. Hand trim excavations if required for conformance with dimensions and elevations indicated on the Drawings. Remove excess material.

### 3.05 PIPE INSTALLATION

- A. Unless otherwise called for on the Drawings, the minimum permissible slope of storm drain piping is one percent (1/8-inch per foot).
- B. Install and join pipe and fittings to lines and grades indicated on the Drawings in accordance with manufacturer's instructions and with applicable requirements of the Standard Specifications, Reference Specifications, and Reference Details. Hand shape bedding material as required to accommodate and to provide uniform support for pipe barrel and bell and for pipe fittings.
- C. If the design slope for storm drain piping is less than one percent (1/8-inch per foot), before placing pipe zone backfill have Licensed Surveyor confirm that line and grade of pipe and fittings conform with plan requirements by determining invert elevation of in-place piping opposite each grade stake.
- D. Construct PVC pipe bends using multiple 22<sup>1</sup>/<sub>2</sub>-degree fittings installed in series to achieve required deflection.
- E. Construct PVC pipe-to-pipe junctions using 45 degree straight or reducing wye fittings with branch laid at lateral pipe slope. Saddles are not permitted.
- F. Where cast or ductile iron pipe will remain in contact with soil after construction, encase the pipe in a polyethylene sheath, conforming to Paragraph 2.01-C.3 hereof, during installation.

# 3.06 FIELD QUALITY CONTROL

A. Request inspection by Owner's Representative after installation and assembly of, but before covering, storm drainage piping.

- B. Before construction of pavement, walkways and other permanent surface improvements, provide a construction record drawing of the system prepared by a California Registered Land Surveyor to include top of grate or solid cover and inlet and outlet invert elevations of all storm drain structures, whether located in hard surfaced or in dirt / landscaped areas. Elevation measurements shall be accurate to 0.01 foot.
- C. Before construction of pavement, walkways and other permanent surface improvements, perform Water Exfiltration Test on storm drain piping and structures per SSPWC Section 306-1.4.2 except that "sewer" shall mean storm drain, "manhole" shall mean catch basin, water test level shall be 4 feet above catch basin invert or to top of frame level, whichever is less, and test period shall be 4 hours.
- D. Upon completion of construction of the storm drain system and with 48 hours notice to Owner's Representative, thoroughly clean and wash-down all inlets and storm drain piping. Immediately after cleaning, perform mandrel testing of PVC storm drains in accordance with Section 306-1.2.12 of the SSPWC.
- E. Within 48 hours of system cleaning and mandrel testing and prior to allowing any substance other than water into the storm drain system, supply water into the system for system review by the Owner's Representative.

If standing water is observed anywhere in system, third party video taping of the system shall then be scheduled by the Owner's Representative and performed at the Contractor's expense.

- F. Surveying, cleaning, mandrel testing and videotaping of the storm drain system shall be at Contractor's expense. Any deviation from the approved plans and design intent noted by the Owner's Representative during this process shall be corrected by Contractor at Contractor's expense and to the satisfaction of the Owner's Representative prior to acceptance of the system and final payment.
- G. ACCEPTABLE TOLERANCES:

1.	Top-of-Grate:	<sup>1</sup> / <sub>2</sub> inch (0.04 foot) maximum deviation above or below design elevation in dirt surface.
		<sup>1</sup> / <sub>4</sub> inch (0.02 foot) maximum deviation above or below design elevation in concrete or A.C. pavement surfacing.
2.	Structure invert:	<sup>1</sup> / <sub>2</sub> inch (0.04 foot) deviation above or below design elevation and no standing water in structure or upstream pipe.
3.	Pipe Invert:	$\frac{1}{2}$ inch (0.04 foot) maximum deviation above or below design elevation at any location or 10

percent of design slope over any reach, whichever is less, and no standing water.

4. In all such cases, deviations within the specified tolerances shall be compensating such that the average design slopes and elevations conform to those specified per plan.

Section continues on next page.

### 3.07 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 [Contractor is to acknowledge with initials each submittal included] <u>Initials:</u>\_\_\_\_\_

- Letter of explanation attached for each submittal not included.
- \_\_\_\_\_ All submitted products are as specified.
- B. SUBMITTAL SCHEDULE
  - 1. Submit manufacturer's product data and recommended installation procedures for storm drain pipe and fittings.

END OF SECTION 334100

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### SECTION 334900 - STORM DRAINAGE STRUCTURES

# PART 1 – GENERAL

- 1.01 SUMMARY
  - A. Includes materials, equipment, transportation and labor as required for construction of cast-in-place catch basins and precast concrete manholes on storm drain piping systems.
- 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 312300: Trenching and Backfilling
  - B. Section 312500: Construction Storm Water Pollution Prevention
  - C. Section 321313: Site Concrete
  - D. Section 334100: Storm Drainage Piping

#### 1.04 STANDARD SPECIFICATIONS

- A. Construction materials and methods shall be in accordance with the *Standard Specifications for Public Works Construction*, 2021 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 / REFERENCE DETAILS
  - A. Materials shall conform to the applicable requirements of American Society for Testing and Materials (ASTM) Standards, American Water Works Association (AWWA) Standards and American National Standards Institute (ANSI) Standards, latest editions.
  - B. Polyvinyl chloride (PVC) storm drain construction shall be in accordance with the *Handbook of PVC Pipe*, latest edition, published by the Uni-Bell Plastic Pipe Association.
  - C. Where called for on the Drawings or in these Specifications, construction materials and methods shall be in accordance with *City of Santa Barbara Public Works Department Construction Standard Details* dated November 2012.

- 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.
- E. In case of conflict between the Standard Specifications and Reference Specifications, the Reference Specifications shall govern.
- F. In case of conflict between Reference Specifications / Details and the Project Specifications / details, the more stringent provision shall govern, as determined by the Architect and the 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.
- 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 RECORD DOCUMENTS
  - A. Comply with requirements of Division 1, "Project Record Documents" section, and following:
    - 1. Accurately record location of catch basins, junction structures, piping, bends, connections, and appurtenant structures, including top-of-grate and pipe/structure invert elevations, 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 utilities, for Record Documents.

# PART 2 - MATERIALS

- 2.01 CONCRETE AND REINFORCING STEEL FOR DRAINAGE STRUCTURES
  - A. CONCRETE

- 1. Concrete shall conform with the *California Code of Regulations, Title* 24, Part 2, Chapter 19, concrete.
- 2. Concrete shall conform with Section 321313 hereof.
- B. REINFORCING STEEL
  - 1. Reinforcing steel shall be deformed billet-steel for concrete reinforcing conforming to the most recent issue of ASTM Standard A-615, Grade 60 for bar sizes No. 5 and larger, Grade 40 for bar sizes No. 3 and No. 4. Grade 60 acceptable for all sizes.

### 2.02 CATCH BASINS, CAST-IN-PLACE CONCRETE

- A. DETAIL DRAWING
  - 1. Where called for on the Drawings, catch basin shall be cast-in-place. Cast-in-place catch basin shall be formed inside and outside and shall conform to the applicable Detail presented on the Drawings or to the referenced Standard Plan or Detail.
- B. CONSTRUCTION JOINTS
  - 1. Drainage structure base and walls to a height equal to one nominal pipe diameter (12 inches minimum) above the outlet soffit (top of pipe) shall be poured monolithically. If judged necessary by contractor, one construction joint may be used between this height and the top of structure; surface of initial pour shall be roughened to provide ¼" amplitude and shall be coated with epoxy prior to final pour.

#### C. WATERSTOP

1. Waterstop for pipe penetrations of catch basin walls shall be elastomeric PVC Concrete Manhole Adapter for 4" through 12" nominal diameter pipe and Large Diameter Waterstop for nominal pipe diameters greater than 12", as manufactured by FERNCO or approved equivalent.

### 2.03 MANHOLES

- A. Storm drain manhole shall conform with the applicable detail presented on the Drawings or to the referenced Standard Plan or Detail.
  - 1. All joints between wall sections and between grade rings shall be sealed.
  - 2. Full circumference waterstop shall be cast-in-place on pipe penetration at midpoint of wall.
  - 3. Manway shaft shall be centered above upstream pipe inlet.

- 4. Channel through base shall slope (drop) across structure as called for on Drawings and 0.10 foot minimum.
- 5. Solid cover shall be lettered: "STORM DRAIN." Frame and cover shall be galvanized if located within concrete flatwork area.
- 6. Frame and cover shall conform with additional requirements of Paragraph 2.07 below.
- 7. When manhole is located within concrete flatwork area, frame for cover shall be cast directly in flatwork concrete.

# 2.04 GRATES / COVERS

- A. Unless otherwise called for on the Drawings or specified herein, catch basin grates shall be bicycle-proof (not ADA compliant) H-20 traffic-weight cast iron grate supplied with frame. Size shall be as manufactured for catch basin clear opening called for on the Drawings. Dimensions of bicycle-proof grate openings shall comply with CalTrans Standard Plan D77-B (nominally 1 ½" wide by 5" long).
- B. When catch basin is to be constructed in walkway or where otherwise called for on the Drawings, grate shall be ADA compliant non-traffic weight cast iron grate supplied with frame. ADA compliant grate shall have slotted openings, uniformly ½ inch in width, to be oriented perpendicular to the path of pedestrian travel.
- C. If required ADA compliant grate is in vehicle traffic area, H-20 traffic-weight welded steel grate with frame meeting specified dimensional requirements shall be used in place of cast iron.
- D. Where high-heel-proof grate is called for on the Drawings, the grate shall be specifically manufactured for that purpose. Grate retrofitted with perforated plate is not acceptable.
- E. Where catch basin or other drainage structure is to be constructed with solid cover, cover shall be supplied with diamond tread non-slip surface.
- F. In all cases, grates and frames shall be galvanized and supplied with at least two (2) Stainless Steel Allen-head capscrews connecting grate to frame to prevent vandalism. When tightened in place, top of capscrew shall not protrude above surface of grate or frame.

Solid covers and frames shall be galvanized only if structure is located in concrete flatwork area.

- G. These requirements apply to all drainage structures, whether detailed on the Drawings or referenced.
- 2.05 RIP RAP / CHECK DAMS / SPLASH PADS
  - A. ROCK

- 1. Rock for check dams, splash pads and rip rap shall be angular quarry stone and shall be sound, durable, hard, resistant to abrasion and free from laminations, weak cleavage planes, and the undesirable effects of weathering; it shall be of such character that it will not disintegrate from the action of air, water, or the conditions to be met in handling and placing.
- 2. All rock material shall be clean and free from deleterious impurities, including alkali, earth, clay, refuse and adherent coatings.
- B. GROUT
  - 1. Cement grout for check dams, splash pads and rip rap, where called for on the plans, shall be fine grout conforming to ASTM Standard C476, latest revision, and shall attain minimum compressive strength of 2000 PSI in 28 days. Slump shall be 8 to 11 inches.

# PART 3 - EXECUTION

# 3.01 GENERAL REQUIREMENTS

- A. Before beginning work, determine or verify the location and flowline elevation of all existing drainage structures and pipes to be joined by new construction.
- B. 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 excavation / foundation geometry is determined to be contrary to this requirement, request direction from Owner's Representative before proceeding with the work.
- C. Employ a Licensed Surveyor to provide line and grade control stakes for construction of storm drain facilities, to survey locations of existing facilities to be joined by or which may interfere with new construction, and to provide conformation during construction that facilities are at required line and grade.

# 3.02 EXCAVATION EXAMINATION

- A. Verify that excavation dimensions and elevations are as indicated on the Drawings, including due allowance for required thickness of bedding material, and that the excavation is ready to receive storm drainage structure and/or pipeline work.
- B. Verify that excavation finish subgrade condition has been reviewed and approved by the Construction-Phase Geotechnical Engineer.

# 3.03 EXCAVATION PREPARATION

A. Hand trim excavations if required for conformance with dimensions and elevations indicated on the Drawings. Remove excess material.

# 3.04 CATCH BASINS

- A. Have approved grates or covers and frames on-site before forming cast-in-place drainage structures.
- B. Construct cast-in-place and pre-cast concrete drainage structures in accordance with the Drawing details or Reference Details to the lines and grades and dimensions indicated on the Drawings.
  Catch basins shall be placed such that grates are aligned to match (parallel to) adjacent structures.
- C. Install full circumference water stops around pipe penetrations in both cast-in-place and pre-cast structure walls.
- D. Configure the bottoms of both cast-in-place and pre-cast drainage structures to provide positive drainage to the flowline of the outlet pipe so as to prevent ponding.

### 3.05 RIP RAP/CHECK DAMS / SPLASH PADS

- A. Perform grading operations as necessary to construct subgrade to required line, grade and compaction density.
- B. Hand trim excavation if required for conformance with dimensions and elevations indicated on the Drawings. Remove excess material.
- C. Request observation and testing of subgrade condition by Construction-Phase Geotechnical Engineer; do not place geotextile fabric or rock until subgrade has been approved.
- D. Place geotextile fabric (where called for) and rock in accordance with the Drawings.
- E. Where rock is to be grouted, hold grout level down or back 3 inches from exposed rock surface.

# 3.06 FIELD QUALITY CONTROL

- A. Request inspection by Owner's Representative after forming and placing reinforcing steel for castin-place drainage structures, and placing pipe with waterstop at wall penetrations, but before scheduling the concrete pour.
- B. Before construction of pavement, walkways and other permanent surface improvements, provide a construction record drawing of the system prepared by a California Registered Land Surveyor to include top of grate or solid cover and inlet and outlet invert elevations of all storm drain structures, whether located in hard surfaced or in dirt / landscaped areas. Elevation measurements shall be accurate to 0.01 foot.

- C. Before construction of pavement, walkways and other permanent surface improvements, perform Water Exfiltration Test on storm drain piping and structures per SSPWC Section 306-1.4.2 except that "sewer" shall mean storm drain, "manhole" shall mean catch basin, water test level shall be 4 feet above catch basin invert or to top of frame level, whichever is less, and test period shall be 4 hours.
- D. Upon completion of construction of the storm drain system and with 48 hours' notice to Owner's Representative, thoroughly clean and wash-down all inlets and storm drain piping. Immediately after cleaning, perform mandrel testing of PVC storm drains in accordance with Section 306-1.2.12 of the SSPWC.

# E. ACCEPTABLE TOLERANCES:

1.	Top-of-Grate:	<sup>1</sup> / <sub>2</sub> inch (0.04 foot) maximum deviation above or below design elevation in dirt surface.
		<sup>1</sup> / <sub>4</sub> inch (0.02 foot) maximum deviation above or below design elevation in concrete or A.C. pavement surfacing.
2.	Structure invert:	<sup>1</sup> / <sub>2</sub> inch (0.04 foot) deviation above or below design elevation and no standing water in structure or upstream pipe.
3.	Pipe Invert:	<sup>1</sup> / <sub>2</sub> inch (0.04 foot) maximum deviation above or below design elevation at any location or 10 percent of design slope over any reach, whichever is less, and no standing water.

4. In all such cases, deviations within the specified tolerances shall be compensating such that the average design slopes and elevations conform to those specified per plan.

#### 3.09 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 [Contractor is to acknowledge with initials each submittal included] <u>Initials:</u>\_\_\_\_\_

- \_\_\_\_\_ Letter of explanation attached for each submittal not included.
- \_\_\_\_\_ All submitted products are as specified.

# B. SUBMITTAL SCHEDULE

- 1. Submit manufacturer's product data for grates, solid covers and frames for drainage structures.
- 2. Submit manufacturer's product data for waterstop to be used for pipe connections at drainage structures.
- 3. Submit concrete mix design for each class of concrete and grout required.

END OF SECTION