

# PROJECT MANUAL

## Valley Robotics Extension Road Project

13451 N. Extension Road  
Lodi, CA 95242

**DSA O.T.C.**  
February 13, 2020

Developed For:  
**Lodi Unified School District**

1305 E. Vine Street  
Lodi, CA 95240

Volume 1 of 1  
Divisions 01-33

LPA Project No. 19160.11

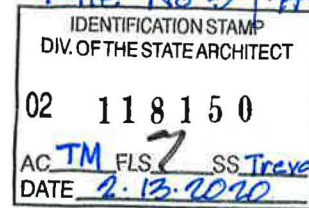


**SECTION 000002 - PROJECT DIRECTORY**

Owner:

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T- 209.331.7000

Contact:  
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CBO



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Contact:  
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Architect of Record



(Seal)

Electrical Engineer:

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Steve Bakin, #E-17415  
Electrical Engineer of Record



**END OF SECTION**



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**SECTION 01 1000  
SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: Valley Robotics Extension Road
- B. Owner's Name: Lodi USD.
- C. Architect's Name: LPA Inc.

**1.02 OWNER OCCUPANCY**

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Owner intends to occupy a certain portion of the Project prior to the completion date for the conduct of normal operations.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

**1.03 CONTRACTOR USE OF SITE AND PREMISES**

- A. Arrange use of site and premises to allow:
  - 1. Owner occupancy.
  - 2. Work by Others.
- B. Provide access to and from site as required by law and by Owner:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Utility Outages and Shutdown:
  - 1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
  - 2. Limit shutdown of utility services to two hours at a time, arranged at least 24 hours in advance with Architect.
  - 3. Prevent accidental disruption of utility services to other facilities.
- D. Controlled Substances: Use of tobacco products and other controlled substances on the Project site is not permitted.

**1.04 WORK SEQUENCE**

- A. Coordinate construction schedule and operations with Owner.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



## **SECTION 01 2500 SUBSTITUTION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for substitutions.

#### **1.02 RELATED SECTIONS**

- A. Section 016000 - Product Requirements, for submittal procedures and contract document revisions initiated by Contractor.

#### **1.03 DEFINITIONS**

- A. Project Completion: Final Completion, unless otherwise indicated.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 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 in order to meet other Project requirements but may offer advantage to Contractor or Owner.
    - a. Substitutions for Convenience shall include any comparable ("or equivalent") product, including proposed changes to named products, proposed changes to listed manufacturers and proposed changes to basis-of-design products, unless a Substitution for Cause regarding the comparable products can be properly demonstrated by the Contractor.

#### **1.04 SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use facsimile of appropriate form provided in the Project Manual.
  - 2. Documentation: Submit the information indicated below to provide the Architect with the minimum information necessary to fairly review and evaluate the proposed substitutions, proposed comparable products and proposed changes to specified products. Show compliance with requirements and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information which will be necessary to accommodate proposed substitution, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors.
    - c. Detailed side by side comparison of significant qualities of proposed substitution 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 and mock-ups, 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 and 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 or other code organizations acceptable to authorities having jurisdiction.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating 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.
  - l. 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.
3. 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 through Construction Manager of acceptance or rejection of proposed substitution within fourteen days of receipt of request, or within fourteen days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order or Construction Change Directive. Architect's Supplemental Instructions may be used 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.

#### **1.05 QUALITY ASSURANCE**

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

#### **1.06 PROCEDURES**

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

### **PART 2 - PRODUCTS**

#### **2.01 SUBSTITUTIONS**

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than fourteen 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 35 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 3 - EXECUTION (NOT USED)**



**END OF SECTION 012500.00**



**SUBSTITUTION REQUEST - FORM "A"**  
- For use during BIDDING period -

**LPA**

<b>Project Name:</b>		<b>Job No.</b>	
		<b>Date:</b>	
<b>To: Architect:</b> LPA, Inc.		<b>Contractor:</b>	
<b>Specified Item:</b>			
<b>Specification Section</b>	<b>Paragraph No.</b>	<b>Drawing No.</b>	<b>Detail No.</b>
<b>Contractor's Proposed Substitution:</b>			
<b>Reason For Request:</b> _____ _____			
<b>Manufacturer:</b> _____			
<b>Manufacturer Contact:</b> _____			
<b>Manufacturer Telephone:</b> _____			
<b>Trade Name and Model:</b> _____			
<b>History:</b> <input type="checkbox"/> New Product <input type="checkbox"/> 1-4 years in market <input type="checkbox"/> 5-10 years in market <input type="checkbox"/> over 11 years in market			
<b>Mandatory for Consideration: Specification Section 012500- Substitution Procedures</b>			
<input type="checkbox"/> Drawings <input type="checkbox"/> Product Data <input type="checkbox"/> Samples <input type="checkbox"/> Test Data <input type="checkbox"/> Reports <input type="checkbox"/> Other _____			
Attach a <b>Point-by-Point Comparison</b> between proposed product and product indicated. Provide complete data for proposed product, including product / material descriptions, specifications, drawings, photographs, performance, MSDS data sheet and test data adequate for evaluation of the request. Clearly annotate applicable portions of the data. Include ICC Evaluation Service (ICC ES) Evaluation Report, if applicable.			
The Undersigned certifies: <ul style="list-style-type: none"><li>- Proposed substitution has been fully investigated and determined to be equivalent or superior in all respects to specified product.</li><li>- Proposed substitution complies with applicable Codes, ordinances and standards.</li><li>- Proposed substitution complies with Contract requirements.</li><li>- Same warranty will be furnished for proposed substitution as for specified products.</li><li>- Same maintenance service and source of replacement parts, as applicable, are available.</li><li>- Proposed substitution will have no adverse effect on related Work and will not affect or delay progress of the Work.</li><li>- Proposed substitution does not affect dimensions and functional clearances.</li><li>- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.</li></ul>			
<b>Submitted by: (name)</b> _____		<b>Title:</b> _____	
<b>Signed:</b> _____		<b>Date:</b> _____	



**SUBSTITUTION REQUEST - FORM "A"**  
- For use during BIDDING period -



**Architect's Recommended Action:**

- ☐ **Approved.** Refer to Addendum # \_\_\_\_\_
- ☐ **Approved As Noted.** Refer to Addendum # \_\_\_\_\_
- ☐ Proposed substitution SUBJECT to receive approval by Division of the State Architect (DSA) for compliance with applicable provisions of California Code of Regulations (CCR), Title 24 of the California Building Standards Code (CBSC).
- ☐ **Rejected - Use specified product / materials.**
- ☐ **Request received too late - Use specified product / materials.**
- ☐ **Request does not have DSA approval - Use specified product / materials.**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Remarks: \_\_\_\_\_

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



**SUBSTITUTION REQUEST - FORM "B"**  
- For use AFTER execution of Contract -

**LPA**

<b>Project Name:</b> Valley Robotics Extension Road		<b>LPA Inc. Job No.</b> 19160.11	
		<b>Substitution No.</b>	
<b>To:</b> LPA Inc.	<b>Contractor:</b>		
<b>Specified Item:</b>			
<b>Specification Section</b>	<b>Paragraph No.</b>	<b>Drawing No.</b>	<b>Detail No.</b>
<b>Contractor's Proposed Substitution:</b>			
<b>Reason For Request:</b> _____ _____			
<b>Manufacture:</b> _____			
<b>Manufacturer Contact:</b> _____			
<b>Manufacturer and Telephone:</b> _____			
<b>Trade Name and Model:</b> _____			
<b>Mandatory for Consideration:</b> (Specification Section 012500 – Substitution Procedures)			
<input type="checkbox"/> Drawings <input type="checkbox"/> Product Data <input type="checkbox"/> Samples <input type="checkbox"/> Test Data <input type="checkbox"/> Reports <input type="checkbox"/> Other _____			
<small>Attach a <b>Point-by-Point comparison against detailed and specified products</b> with complete data, including product / material descriptions, specifications, drawings, photographs, performance, MSDS data sheet and test data adequate for evaluation of the request. Clearly annotate applicable portions of the data. Include ICC Evaluation Service (ICC ES) Evaluation Report, if applicable.</small>			
<small>The Undersigned certifies:</small> <ul style="list-style-type: none"><li>- Proposed substitution has been fully investigated and determined to be equivalent or superior in all respects to specified product.</li><li>- Proposed substitution complies with applicable Codes, ordinances and standards.</li><li>- Same warranty will be furnished for proposed substitution as for specified products.</li><li>- Same maintenance service and source of replacement parts, as applicable, are available.</li><li>- Proposed substitution will have no adverse effect on related Work and will not affect or delay progress of the Work.</li><li>- Proposed substitution does not affect dimensions and functional clearances.</li><li>- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.</li></ul>			
<b>Submitted by: (name)</b> _____		<b>Title:</b> _____	
<b>Signed:</b> _____		<b>Date:</b> _____	



**Architect's Recommended Action:**

- ☐ **Approved.** Refer to Change Order #\_\_\_\_
- ☐ **Approved As Noted.** Refer to Change Order # \_\_\_\_
- ☐ **Rejected - Use specified product / materials.**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Remarks: \_\_\_\_\_



**SECTION 01 2600  
CONTRACT MODIFICATION PROCEDURES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Division 01 Sections "Substitution Procedures" for administrative procedures for handling requests for substitutions made after Contract award.

**1.02 MINOR CHANGES IN THE WORK**

- A. Architect may issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on the following form:
  - 1. AIA Document G710, "Supplemental Instructions" or similar form acceptable to the Architect.

**1.03 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. 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 twenty 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 form 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 Division 01 Section "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.

#### **1.04 CHANGE ORDER PROCEDURES**

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

#### **1.05 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 or similar form. 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: Unless otherwise directed, provide detailed change pricing prior to actual change in Work. When directed, and when change pricing cannot be completed and agreed prior to actual change in Work, maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. Submit an itemized account and supporting data necessary to substantiate cost adjustments to the Contract.
    - 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 required or requested, furnish survey data to substantiate quantities.
      - 1) Provide invoices and billing statements supporting material and labor costs.
    - 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.
      - 1) Provide copies of detailed daily reports, verified by Project inspector, or accepted third party, supporting labor and supervision costs.
    - d. Include overhead and profit itemization.
      - 1) Overhead and profit shall not exceed 10% for work directly self-performed by Subcontractor.
      - 2) Overhead and profit shall not exceed 5% for any work not directly self-performed by Contractor.
    - e. Include bond costs where change amount causes Contract Sum to exceed bonded amount.
      - 1) Bond costs shall not exceed 1.5% of the proposed cost adjustment.



2. Submit an itemized account and supporting data necessary to substantiate time adjustments to the Contract.
  - a. 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.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION 012600**



**SECTION 01 2900  
PAYMENT PROCEDURES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

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

**1.02 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.

**1.03 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. 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 ten days before the date scheduled for submittal of initial Application for Payment.
  - 3. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract as described in Division 01 Section "Summary."
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section. Provide additional detail as required or requested.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. 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. Item number.
  - b. Description of the Work.
  - c. Dollar value.
    - 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. Coordinate with the Project Manual table of contents. Provide at least two line items for principal subcontract amounts in excess of five percent of Contract Sum, as follows:
  - a. Labor
  - b. Equipment and material.
5. Include separate line items under Division 01 heading for prime contract and principal subcontracts for project closeout requirements in an amount of at least five percent of the Contract Sum and subcontract amounts.
6. Round all amounts to nearest whole dollar; total shall equal the Contract Sum.
7. 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.
8. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
9. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
10. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
11. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
12. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### **1.04 APPLICATIONS FOR PAYMENT**

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.



1. Initial Application for Payment, Application for Payment at time of Project Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Progress payments shall be submitted to Architect by the twenty-fifth 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 five days prior to due date for review by Architect.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 or similar form acceptable to Architect as form for Applications for Payment.
- E. Application for Payment Forms: Use forms provided by Owner for Applications for Payment. Sample copies are included in the Project Manual.
- F. Application for Payment Forms: Use forms acceptable to Architect and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.
- G. Application Preparation: Complete every entry on form. Notarize and 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.
- H. Transmittal: Submit five signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. Owner's copy shall include waivers of lien and similar attachments.
  1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- I. 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. Waiver Forms: Submit waivers of lien on forms complying with California law, executed in a manner acceptable to Owner.



- J. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
  - 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 waivers of lien on forms, executed in a manner acceptable to Owner.
- K. 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. Submittal schedule (preliminary if not final).
  - 5. List of Contractor's principal consultants.
  - 6. Copies of building permits.
  - 7. Initial progress report.
  - 8. Report of preconstruction conference.
- L. Application for Payment at Project Completion: Submit an Application for Payment showing 100 percent completion for portion of the Work claimed as complete.
  - 1. Include documentation supporting claim that the Work is complete and a statement showing an accounting of changes to the Contract Sum.
  - 2. This application shall reflect any Certificates of Partial Project Completion issued previously for Owner occupancy of designated portions of the Work.
- M. 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. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  - 3. Updated final statement, accounting for final changes to the Contract Sum.
  - 4. Final, unconditional lien releases (in exchange for final payment).
  - 5. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  - 6. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  - 7. AIA Document G707, "Consent of Surety to Final Payment."
  - 8. Evidence that claims have been settled.



9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Project Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
10. Final liquidated damages settlement statement.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION 012900.00**



**SECTION 01 3100  
PROJECT MANAGEMENT AND COORDINATION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

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

**1.02 DEFINITIONS**

- A. Project Completion: Final Completion, unless otherwise indicated.
- B. RFI: Request from Owner, Construction Manager, Architect, or Contractor seeking information from each other during construction.

**1.03 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, and telephone number 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.
  - 4. 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 and telephone numbers, including home, office, and 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.

**1.04 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.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

#### 1.05 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings in accordance with requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
  1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Prepare coordination drawings to comply with accepted industry drafting standards. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Applicable Drawings may be used as a basis for preparation of coordination drawings, provide title blocks, stamps and certifications are removed. Prepare additional sections, elevations, and details as needed to describe relationship of various systems and components.
      - 1) Provide review stamp, with signature and date, of each trade proposed to work within the opening or penetration
    - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.



- 1) Provide review stamp, with signature and date, of each contractor and trade proposed to work within the opening or penetration.
  - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - 1) Grid lines and levels, and references to appropriate Contract drawings.
    - 2) Location and dimensions of openings and penetrations.
  - d. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
  - e. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
  - f. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
  - g. Indicate required installation sequences.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire protection, fire alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
  3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire protection, fire alarm, and electrical equipment.
  4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
    - a. Include all items located within the opening or penetration, and dimensioned clearance to edge of penetration. Include framing, equipment, suspension systems, piping, ductwork, cable systems and other construction. Include insulation, supports, clamps, sealants and accessory items.
  5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  6. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    - c. Fire-rated enclosures around ductwork.
  7. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) diameter and larger.



- b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire alarm locations.
  - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
  - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
- 8. Fire Protection System: Show the following:
  - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
- 9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility. If the Architect determines that the coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, the Architect will so inform the Contractor, who shall make changes as directed and resubmit.
- 10. Coordination Drawing Prints: Prepare coordination drawing prints in accordance with requirements of Division 01 Section "Submittal Procedures."
- C. Coordination Digital Data Files: At Contractor's option, prepare coordination digital data files in accordance with the requirements of Division 01 Section "Submittal Procedures."
  - 1. File Preparation Format: DWG, Version , operating in Microsoft Windows operating system.

#### **1.06 REQUESTS FOR INFORMATION (RFIS)**

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of Architect and Construction Manager.
  - 6. RFI number, numbered sequentially.
  - 7. RFI subject.
  - 8. Specification Section number and title and related paragraphs, as appropriate.
  - 9. Drawing number and detail references, as appropriate.
  - 10. Field dimensions and conditions, as appropriate.
  - 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 12. Contractor's signature.
  - 13. Attachments: Include sketches, descriptions, measurements, 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.
  - b. Photographs shall not be accepted as a substitute for engineering sketches. Photographs may be submitted as supplements to properly prepared sketches and coordination drawings.
- C. RFI Forms: Form bound in the Project Manual, or other software-generated form with substantially the same content as indicated above, acceptable to Architect and Construction Manager.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect or Construction Manager after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within seven days of receipt of the RFI response.
  4. Name and address of Architect and Construction Manager.
  5. Date Architect's and Construction Manager's response was received.
- E. On receipt of Architect's and Construction Manager's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- F. Upon completion of Project, submit three complete archive copies of Project Web site files to Owner, Construction Manager and to Architect in a digital storage format acceptable to the Architect.



- G. Contractor, subcontractors, and other parties granted access by the Contractor to project Web site shall execute a data licensing agreement in the form of an Agreement acceptable to the Owner, Construction Manager and Architect.

**1.07 PROJECT MEETINGS**

- A. General: Construction Manager will schedule and conduct basic meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Entity responsible for conducting meeting will inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
  2. Agenda: Entity responsible for conducting meeting will prepare and distribute the meeting agenda.
  3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved, and distribute the meeting minutes to everyone concerned, within seven days of the meeting.
- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than fifteen days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
  2. Attendees: Authorized representatives of Owner, Construction Manager, 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.
  3. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - 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.
    - i. Procedures for processing Applications for Payment.
    - j. Distribution of the Contract Documents.
    - k. Submittal procedures.
    - l. Sustainable design requirements.
    - m. Preparation of record documents.
    - n. Use of the premises.
    - o. Work restrictions.
    - p. Working hours.
    - q. Owner's occupancy requirements.
    - r. Responsibility for temporary facilities and controls.



- s. Procedures for moisture and mold control.
- t. Procedures for disruptions and shutdowns.
- u. Construction waste management and recycling.
- v. Parking availability.
- w. Office, work, and storage areas.
- x. Equipment deliveries and priorities.
- y. First aid.
- z. Security.
- aa. Progress cleaning.
- bb. Labor law, including payment and reporting requirements.
- 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Contractor shall conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
  - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting.
    - a. Advise the following of scheduled meeting dates:
      - 1) Construction Manager
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Sustainable design requirements.
    - i. Review of mockups.
    - j. Possible conflicts.
    - k. Compatibility problems.
    - l. Time schedules.
    - m. Weather limitations.
    - n. Manufacturer's written recommendations.
    - o. Warranty requirements.
    - p. Compatibility of materials.
    - q. Acceptability of substrates.
    - r. Temporary facilities and controls.
    - s. Space and access limitations.



- t. Regulations of authorities having jurisdiction.
  - u. Testing and inspecting requirements.
  - v. Installation procedures.
  - w. Coordination with other work.
  - x. Required performance results.
  - y. Protection of adjacent work.
  - z. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: The project closeout conference shall review requirements and responsibilities related to Project closeout.
- 1. If not conducted as part of a normally scheduled job progress meeting, Construction Manager will schedule and conduct a Project closeout conference, at a time convenient to Owner, Architect and Contractor, but no later than thirty days prior to the scheduled date of Project Completion.
  - 2. Attendees: Authorized representatives of Owner, Architect, 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 Project Completion and for final inspection for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for completing sustainable design documentation.
    - e. Requirements for preparing operations and maintenance data.
    - f. Requirements for delivery of material samples, attic stock, and spare parts.
    - g. Requirements for demonstration and training.
    - h. Preparation of Contractor's punch list.
    - i. Procedures for processing Applications for Payment at Project Completion and for final payment.
    - j. Submittal procedures.
    - k. Coordination of separate contracts.
    - l. Requirements for completing sustainable design documentation.
    - 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.
- E. Progress Meetings: Construction Manager will conduct progress meetings at weekly intervals.
  1. Coordinate preparation of payment requests with dates of meetings.
  2. Attendees: In addition to representatives of Owner, Construction Manager, 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) Resolution of BIM component conflicts.
      - 4) Status of submittals.
      - 5) Status of sustainable design documentation.
      - 6) Deliveries.
      - 7) Off-site fabrication.
      - 8) Access.
      - 9) Site utilization.
      - 10) Temporary facilities and controls.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Status of correction of deficient items.
      - 14) Field observations.
      - 15) Status of RFIs.
      - 16) Status of proposal requests.
      - 17) Pending changes.
      - 18) Status of Change Orders.
      - 19) Pending claims and disputes.
      - 20) Documentation of information for payment requests.
  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:** Contractor shall revise construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Contractor shall provide revised schedule to reporting entity so that is may be issued concurrently with the report of each meeting.
- F. **Coordination Meetings:** Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
  1. **Construction Manager** will conduct project coordination meetings at weekly intervals. Revise first subparagraph below if Project requires coordination meetings on a monthly or weekly basis.
  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 meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. **Agenda:** Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. **Combined Contractor's Construction Schedule:** Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - b. **Schedule Updating:** Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    - c. **Review present and future needs of each contractor present, including the following:**
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Resolution of BIM component conflicts.
      - 4) Status of submittals.
      - 5) Deliveries.
      - 6) Off-site fabrication.
      - 7) Access.
      - 8) Site utilization.
      - 9) Temporary facilities and controls.
      - 10) Work hours.
      - 11) Hazards and risks.
      - 12) Progress cleaning.
      - 13) Quality and work standards.
      - 14) Change Orders.
  4. **Reporting:** Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.



Valley Robotics Extension Road  
Lodi USD

LPA No. 19160.11  
DSA Final January 15, 2020

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION 013100**



## REQUEST FOR INTERPRETATION



<b>Project Name:</b> Valley Robotics Extension Road		<b>LPA Inc. Job No.</b> 19160.11	
		<b>RFI No.</b>	
<b>To: LPA Inc.</b> 431 I Street, Suite 107 Sacramento CA 95814		<b>Contractor:</b>	
<b>Subject:</b>			
<b>Specified Section</b>	<b>Paragraph No.</b>	<b>Drawing No.</b>	<b>Detail No.</b>
<b>Category:</b> <input type="checkbox"/> Need for Clarification <input type="checkbox"/> Unforeseen Condition <input type="checkbox"/> Conflict Within Documents		<input type="checkbox"/> Coordination Problem <input type="checkbox"/> Other	
<b>Description:</b>			
<b>Contractor's Proposed Resolution:</b>			
<input type="checkbox"/> Attachments: <input type="checkbox"/> Cost Impact: \$ (Estimated) <input type="checkbox"/> Time Impact:			
<b>Contractor Signature</b>			<b>Date:</b>
<b>Architect's Response:</b>			
<input type="checkbox"/> Attachments:			
<b>Architect Signature:</b>			<b>Date:</b>



**SECTION 01 3200  
CONSTRUCTION PROGRESS DOCUMENTATION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Contractor's construction schedule.
    - a. Upcoming Work Summaries (Short Interval Schedules).
  - 2. Construction schedule updating reports.
  - 3. Special reports.
- B. Related Requirements:
  - 1. Division 01 Section "DSA Quality Requirements" for submitting a schedule of tests and inspections.

**1.02 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 schedule.
  - 3. Successor Activity: An activity that follows another activity in the schedule.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Relational calculations determine when activities can be performed and the critical path of the Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. 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.
- G. Project Completion: Substantial Completion.
- H. Project Completion: Final Completion.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Format for Submittals: Submit required submittals in the following formats, of size required to display entire schedule for entire construction period:
  - 1. Paper copies, in the number required by Division 01 Section "Submittal Procedures."
- B. Start-up construction schedule.



- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
  - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
  - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  - 3. Total Float Report: List of all activities sorted in ascending order of total float.
  - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- E. Material Location Reports: Submit at monthly intervals.
- F. Field Condition Reports: Submit at time of discovery of differing conditions.
- G. Qualification Data: For scheduling consultant.

#### **1.04 QUALITY ASSURANCE**

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
  - 1. Discuss constraints, including work stages.

#### **1.05 COORDINATION**

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, 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.
- C. Contract Time generally refers to calendar days. Coordinate working days, nonworking days and holidays as required to correlate with Contract Time.

### **PART 2 - PRODUCTS**

#### **2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL**

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.
- B. Activities: Treat each building, story or separate area as a separate numbered activity group for each principal element of the Work, as applicable. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than twenty days, unless specifically allowed by Architect.



2. Procurement Activities: Include procurement process activities for the following long lead items and other major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  4. Startup and Testing Time: Include not less than fourteen days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.
  6. Punch List and Final Completion: Include not more than thirty days for punch list and final completion.
- C. 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 Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Uninterruptible services.
    - c. Use of premises restrictions.
    - d. Environmental control.
- D. Upcoming Work Summaries (Short Interval Schedules): Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update, but not less than two week's activity. Submit an updated upcoming work schedule at each job progress meeting. Summarize the following issues:
1. Unresolved issues.

## **2.02 START-UP CONSTRUCTION SCHEDULE**

- A. Bar-Chart Schedule: Submit start-up horizontal bar-chart-type construction schedule within seven days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

## **2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)**

- A. 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.

## **2.04 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)**

- A. Start-up Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- B. CPM Schedule Requirements: Prepare Contractor's construction schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.



1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
- C. CPM Schedule Requirements: Prepare a list of all activities required to complete the Work. Using the start-up network diagram, prepare a skeleton network to identify probable critical paths.
  1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Delivery.
    - b. Fabrication.
    - c. Testing and commissioning.
  2. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
- D. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
  1. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
    - a. Submit value summary printouts one week before each regularly scheduled progress meeting.

## **2.05 REPORTS**

- A. Material Location Reports: At monthly 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:

## **2.06 SPECIAL REPORTS**

- A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

## **PART 3 - EXECUTION**

### **3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. 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.
- B. 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.
- C. As the Work progresses, indicate final completion percentage for each activity.
- D. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

**END OF SECTION 013200.00**



**SECTION 01 3300  
SUBMITTAL PROCEDURES**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Administrative and procedural requirements for submittals required for the Work, including but not limited to; Shop Drawings, Product Data, Samples, material lists, and quality control items as required by the Contract Documents.
- B. Wherever possible, throughout the Contract Documents, the minimum acceptable quality of workmanship and products has been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.
- C. To ensure that specified products are furnished and installed in accordance with the design intent, and procedures have been established for submittal of design data and for its review by District REPRESENTATIVE, ARCHITECT, and/or others.

**1.02 RELATED SECTIONS**

- A. Div 00 - General Conditions.
- B. Section 01 3100.00: Project Management and Coordination.
- C. Section 01 4010.00: DSA Quality Requirements
- D. Section 01 5000.00: Temporary Facilities and Controls.
- E. Section 01 6000: Product Requirements
- F. Division 2 through Division 33.

**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE**

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
- B. Besides submittals for review, information, and closeout, this procedure applies to requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, and any other document any participant wishes to make part of the project record.
- C. Contractor and Architect are required to use this service.
- D. It is Contractor's responsibility to submit documents in PDF format.
- E. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
- F. Users of the service need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, [www.adobe.com](http://www.adobe.com), or Bluebeam PDF Revu, [www.bluebeam.com](http://www.bluebeam.com)), unless such software capability is provided by the service provider.
- G. Paper document transmittals will not be reviewed (except DSA Deferred Approvals and close out M&O Manuals); emailed PDF documents will not be reviewed.
- H. All other specified submittal and document transmission procedures apply, except that electronic document requirements to not apply to samples or color selection charts.



- I. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- J. Project Closeout: Architect will determine when to terminate the service for the project.

### 3.02 GENERAL REQUIREMENT AND PROCEDURES

- A. CONTRACTOR shall package each submittal appropriately for transmittal and handling and will then send ARCHITECT, and DISTRICT REPRESENTATIVE submittal for review per the Project plans and specifications. Submittals will not be accepted from sources other than from CONTRACTOR.
- B. CONTRACTOR shall clearly identify any deviations from the Contract Documents on each submittal. Any deviation not so noted, even if stamped reviewed, is not acceptable.
- C. After ARCHITECT review, ARCHITECT shall transmit submittals to CONTRACTOR, DISTRICT REPRESENTATIVE, and PI. CONTRACTOR shall further distribute to SUBCONTRACTORS and others as required. Work shall not commence, unless otherwise approved by DISTRICT REPRESENTATIVE, and/or ARCHITECT until approved submittals are transmitted to CONTRACTOR.
- D. CONTRACTOR'S Review and Approval: **Every submittal upon which proper execution of the Work is dependent shall bear the CONTRACTORS review and approval stamp, dated and signed by CONTRACTOR.** Certifying that CONTRACTOR (a) has reviewed, checked, and approved the submittal and has coordinated the submittal contents with requirements of Work and Contract Documents including related Work, (b) CONTRACTOR coordinated with all other shop drawings received to date and this duty of coordination has not been delegated to subcontractors, material suppliers, the Architect, or the engineers on this project, (c) determined and verified quantities, field measurements, construction criteria, materials, equipment, catalog numbers and identifications, and similar data, or will do so, and (d) states the Work illustrated or described in the submittal is recommended by CONTRACTOR and the CONTRACTORS warranty will fully apply thereto.
- E. CONTRACTOR shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities requiring sequential activity.
- F. Timing of Submittals:
  - 1. In accordance with General Conditions, CONTRACTOR shall submit to the ARCHITECT, those Shop Drawings, Product Data, diagrams, materials lists, Samples and other submittals required by the Contract Documents.
  - 2. The CONTRACTOR shall submit within ten (10) calendar days of the Notice to Proceed, an itemized listing of required submittals with a scheduled date for each submittal. The schedule of submittals shall provide adequate time between submittals in order to allow for proper review without negative impact to the Construction Schedule.
  - 3. Schedule of submittals shall be related to Work progress, and shall be so organized as to allow sufficient time for transmitting, reviewing, corrections, resubmission, and re-reviewing.
  - 4. CONTRACTOR shall coordinate submittal of related items and ARCHITECT reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received by ARCHITECT.
  - 5. CONTRACTOR shall revise, update and submit submittal schedule to DISTRICT REPRESENTATIVE and ARCHITECT on the first of each month, or as required by the DISTRICT REPRESENTATIVE.



6. CONTRACTOR shall allow in the Construction Schedule, at least fourteen (14) calendar days for ARCHITECT review following ARCHITECT receipt of submittal. For mechanical, plumbing, electrical, structural, and other submittals requiring joint review with ARCHITECT'S Consultants, and/or others, CONTRACTOR shall allow a minimum of eighteen (18) calendar days following ARCHITECT receipt of submittal. Submittals will be reviewed with reasonable promptness, but ARCHITECT reserves the right of additional time where required based on but limited to submittal size, complexity, etc.
7. No adjustments to the Contract Time and/or Milestones will be authorized because of a failure to transmit submittals to ARCHITECT sufficiently in advance of the Work to permit review and processing.
8. In case of product substitution, Shop Drawing preparation shall not commence until such time ARCHITECT and DISTRICT REPRESENTATIVE reviews said submittal relative to the General Conditions.
- G. Resubmit submittals in a timely manner. Resubmit as specified for initial submittal but identify as such. Review times for re-submitted items shall be as per the time frames for initial submittal review.
- H. ARCHITECT, or authorized agent, will stamp each submittal with a uniform, action stamp marking the stamp appropriately to indicate the action taken, as follows:
  1. Final Unrestricted Release: When ARCHITECT, or authorized agent, marks a submittal "Reviewed" the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
  2. Final-But-Restricted Release: When ARCHITECT, or authorized agent, marks a submittal "Make Corrections Noted" (Reviewed as Noted) the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
  3. Returned for Re-submittal: When ARCHITECT, or authorized agent, marks a submittal "Revise and Resubmit, Submit Specified Item, Rejected" do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat as necessary to obtain different action mark. In case of multiple submittals covering same items of Work, CONTRACTOR is responsible for any time delays, schedule disruptions, out of sequence Work, or additional costs due to multiple submissions of the same submittal item. Do not use, or allow others to use, submittals marked "Rejected, Revise and Resubmit" at the Project site or elsewhere where Work is in progress.
  4. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the ARCHITECT, or authorized agent, will return the submittal marked "Action Not Required".
  5. Not Required Submittal: Where a submittal is submitted for review but is not required to be submitted, the ARCHITECT, or authorized agent, will return the submittal identified with "No Action Taken".
- I. Review and Approval of Submittals by the ARCHITECT: Submittals will be reviewed but only for conformance with the design concept of the Project and with the information indicated on the Drawings and stated in the Specifications. Approval of a separate item as such will not indicate approval of the assembly in which the item functions. Approval of submittals shall not relieve the CONTRACTOR of responsibility for any deviations from requirements of the Contract Documents or any revisions in resubmittals unless



CONTRACTOR has given written notice of such deviation or revision at the time of submission or resubmission and written approval has been given to the specific deviation or revision, nor shall approval relieve the CONTRACTOR of responsibility for error or omissions in the submittals or for the accuracy of dimensions and quantities, the adequacy of connections, and the proper and acceptable fitting, execution, functioning, and completion to the Work.

- J. All costs for the preparation, correction, delivery, and return of the submittals shall be borne by the CONTRACTOR.

### **3.03 SHOP DRAWINGS**

- A. Shop Drawings are original drawings in electronic format (except DSA deferred Approvals to be hard copies) prepared by CONTRACTOR, Subcontractor, supplier, or distributor illustrating some portion of Work by showing fabrication, layout, setting, or erection details. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Copies of the Contract Drawing marked to show Shop Drawing information are not acceptable and will be not be reviewed and will be promptly returned to the CONTRACTOR.
- B. Produce DSA Deferred Approval Shop Drawings to an accurate scale that is large enough to indicate all pertinent features and methods. Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 24 x 36 inches.
- C. Shop Drawings shall include, at a minimum, fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
  - 1. Dimensions
  - 2. Identification of products and materials included by sheet and detail number.
  - 3. Compliance with specified standards.
  - 4. Notation of coordination requirements.
  - 5. Notation of dimensions established by field measurement.
- D. Provide two (2) spaces, approximately 4 by 5 inches, on the label or beside the title block on Shop Drawings to record CONTRACTOR and ARCHITECT review, and the action taken. Include the following information on the label for processing and recording action taken:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name and address of ARCHITECT.
  - 5. Name and address of CONTRACTOR.
  - 6. Name and address of Subcontractor.
  - 7. Name and address of supplier.
  - 8. Name and address of manufacturer.
  - 9. Name and title of appropriate Specification section.
  - 10. Drawing number and detail references, as appropriate.

### **3.04 PRODUCT DATA**

- A. Collect Product Data into a single submittal for each element of Work or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, wiring diagrams,



schedules, illustrations, or performance curves.

1. Mark each copy to show or delineate pertinent materials, products, models, applicable choices, or options. Where Product Data includes information on several products that are not required, clearly mark copies to indicate the applicable information. Include the following information:
  - a. Manufacturer's printed recommendations.
  - b. Compliance with trade association standards.
  - c. Compliance with recognized testing agency standards.
  - d. Application of testing agency labels and seals.
  - e. Notation of dimensions verified by field measurement.
  - f. Notation of coordination requirements.
  - g. Notation of dimensions and required clearances.
  - h. Indicate performance characteristics and capacities.
  - i. Indicate wiring diagrams and controls.
2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

### **3.05 SAMPLES**

- A. Submit Samples of sufficient size, quantity, cured and finished and physically identical to the proposed product or material. Samples include partial or full sections or range of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches denoting color, texture, and/or pattern.
  1. Mount or display Samples in the manner to facilitate review of qualities indicated. Include the following:
    - a. Specification section number and reference.
    - b. Generic description of the Sample.
    - c. Sampling source.
    - d. Product name or name of manufacturer.
    - e. Compliance with recognized standards.
    - f. Availability and delivery time.
  2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
    - a. Where variations in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show the approximate limits of the variations.
    - b. Refer to other Specification sections for requirements for Samples that illustrate workmanship, fabrication techniques, assembly details, connections, operation, and similar construction characteristics.
    - c. Refer to other sections for Samples to be returned to CONTRACTOR for incorporation into the Work. Such Samples must be undamaged at time of installation. On the transmittal indicate special requests regarding disposition of Sample submittals.



- d. Samples not incorporated into the Work, or otherwise not designated as OWNER property, remain the property of CONTRACTOR and shall be removed from the Project site prior to Beneficial Occupancy.
- 3. Color and Pattern: Whenever a choice of color or pattern is available in a specified product, submit accurate color chips and pattern charts to ARCHITECT for review and selection by ARCHITECT and OWNER.
- 4. Required Copies and Distribution: Same as denoted in Section 3.02, E.
- B. When specified, erect field Samples and mock-ups at the Project site to illustrate products, materials, or workmanship and to establish standards by which completed Work shall be judged.
- C. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of the Work. Sample sets may be used to obtain final acceptance of the Work associated with each set.

### **3.06 QUALITY CONTROL SUBMITTALS**

- A. Submit quality control submittals, including design data, certifications, manufacturer's field reports, and other quality control submittals as required under other sections of the Contract Documents.
- B. When other sections of the Contract Documents require manufacturer's certification of a product, material, and/or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
- C. Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the represented company.
- D. Requirements for submittal of inspection and test reports are specified in other sections of the Contract Documents.

### **3.07 CERTIFICATES**

- A. Submit all certificates in triplicate to PI, in accordance with requirements of each Specification Section.

**END OF SECTION 013300**



## ELECTRONIC DOCUMENT REQUEST FORM

From (Company): \_\_\_\_\_

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

Contact: \_\_\_\_\_

Phone: \_\_\_\_\_

Project Name: \_\_\_\_\_

Location: \_\_\_\_\_  
\_\_\_\_\_

DSA App. No.: \_\_\_\_\_

LPA Project No.: \_\_\_\_\_

Execution of this document will confirm your request for copies of documentation related to the above referenced project. Please return one fully executed copy of this form via mail to LPA, Inc., **431 I Street, Suite 107, Sacramento, CA 95814**; or via Email.

### Description of Documentation Requested:

Type of Files Needed: ☐ DWG (AutoCAD) ☐ Other \_\_\_\_\_ (subject to review and approval)

### Purpose of Request:

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

**If Requestor is a subcontractor to the project's General Contractor,** A written statement by the Project's General Contractor authorizing LPA to release documentation to a subcontractor of the General Contractor must be written below:  
\_\_\_\_\_  
\_\_\_\_\_

**If Requestor is a consultant to the Project's Owner,** please indicate below the name and phone number of the contact at Owner's Office:  
\_\_\_\_\_  
\_\_\_\_\_

**Disclaimer:** LPA can only release electronic files to the Project's Owner, consultants to the Project's Owner and/or the Projects' General Contractor. Please be advised that, in the case of existing construction, the documents requested are reproductions of documentation on file and do not necessarily represent as-built or existing conditions. LPA does not warrant, in any way, the accuracy of this information and shall not be responsible for any discrepancy between this documentation and the existing conditions.

In the case of projects which are currently being designed and/or under construction, the electronic documentation are reproductions of the documentation on file and may be subject to change due to Owner, field and/or coordination revisions. LPA shall not be responsible for reissuing files beyond the Bid Document files which may be revised after issuance of these requested files and shall not be responsible for advising other parties as to the status of document revisions. Also, please be advised that the requested documents are instruments of service and, as such, remain the property of LPA and/or the respective consultant. Any unauthorized re-use of these documents without the written authorization of LPA and/or consultant is strictly prohibited.

Please note all disclaimers and warnings printed on electronic media labels. Electronic media may contain undetected viruses. It is always recommended that disks be checked prior to use. LPA assumes no liability or responsibility for damage to user's property as a result of using this electronic media or its contents.

**Fees:** The charge for copying the requested files in DWG (AutoCAD) is **\$100.00** per sheet. The cost per sheet / files on a different software platform will be determined based on what is requested. Details are not released.

Other costs to be charged for the requested files may include archive storage and retrieval charges, reproduction and handling expenses, etc. The exact costs for these miscellaneous expenses will be determined by LPA upon execution of this request.

**Payment of these costs must be made by the Requestor prior to shipping of the requested documents.**

By signing this Request, the Requestor agrees to the disclaimer and reimbursement fees to LPA, Inc. as stated above:

Authorized Name and Signature: \_\_\_\_\_

Date: \_\_\_\_\_



## SUBMITTAL COVER SHEET



<b>Project Name:</b> Valley Robotics Extension Road  <b>LPA Inc. Job No.</b> 19160.11	<b>Resubmittal</b>  <input type="checkbox"/> YES  <i>Add "letter" to original number</i>	<b>Submittal No.</b>  						
<b>SUBCONTRACTOR:</b>  <b>Name:</b>  <b>Address:</b>  <b>Telephone:</b>  <b>Contact:</b>	<b>CONTRACTOR:</b>  <b>Name:</b>  <b>Signed:</b>  <b>Dated:</b>  I hereby certify that I have reviewed the attached, have verified field requirements and compliance with the Contract Documents.							
<b>Submittal Description:</b>  		<b>Specification Section:</b>  						
<b>Date Received from Contractor:</b>  	<b>Distribution Date:</b>  							
<b>Consultant Review:</b>  <input type="checkbox"/> Civil <input type="checkbox"/> Electrical <input type="checkbox"/> Mechanical <input type="checkbox"/> Structural <input type="checkbox"/> Other:  <b>Date sent to consultant:</b>  <b>Date received from consultant:</b>	<b>Copies:</b>  <input type="checkbox"/> Contractor  <input type="checkbox"/> Inspector  <input type="checkbox"/> LPA File  <input type="checkbox"/> Owner  <input type="checkbox"/> Other: _____							
Review and commentary noted below are only for general conformance with (1) the design concept of the project and (2) the information given in the contract documents and for no other purpose. Commentary below is subject to the requirements of the contract documents. The Contractor is not relieved from responsibility for any deviation from the requirements of the contract documents, errors or omissions in drawings, calculations or samples, confirmation and correlation of dimensions at the job site, fabrication process and techniques of construction, coordination of his work with that of all other trades and satisfactory performance of his work.								
<table style="width: 100%;"> <tr> <td><input type="checkbox"/> <b>REVIEWED</b></td> <td><input type="checkbox"/> <b>SUBMIT SPECIFIED ITEM</b></td> </tr> <tr> <td><input type="checkbox"/> <b>FURNISH AS CORRECTED</b></td> <td><input type="checkbox"/> <b>REJECTED</b></td> </tr> <tr> <td><input type="checkbox"/> <b>REVISE &amp; RESUBMIT</b></td> <td></td> </tr> </table>			<input type="checkbox"/> <b>REVIEWED</b>	<input type="checkbox"/> <b>SUBMIT SPECIFIED ITEM</b>	<input type="checkbox"/> <b>FURNISH AS CORRECTED</b>	<input type="checkbox"/> <b>REJECTED</b>	<input type="checkbox"/> <b>REVISE &amp; RESUBMIT</b>	
<input type="checkbox"/> <b>REVIEWED</b>	<input type="checkbox"/> <b>SUBMIT SPECIFIED ITEM</b>							
<input type="checkbox"/> <b>FURNISH AS CORRECTED</b>	<input type="checkbox"/> <b>REJECTED</b>							
<input type="checkbox"/> <b>REVISE &amp; RESUBMIT</b>								
<b>Reviewed by:</b>  		<b>Date:</b>  						
<b>Remarks:</b>								



**SECTION 01 4000  
DSA QUALITY REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for DSA-approved quality assurance and quality control.
- B. DSA-approved testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. A minimum Class III Project Inspector employed by the School District and approved by DSA shall provide continuous inspection of the work per Title 24 CCR, Part 1, Section 4-333. The duties of the Project Inspector are defined in Title 24 CCR, Part 1, Section 4-342.
  - 2. Testing and inspection shall comply with Title 24 CCR, Part 1, Section 4-335.
    - a. Required special tests and inspections shall comply with CBC Chapter 17A. Required special tests and inspections shall be as indicated in specifications, drawings and on the DSA-approved Form 103, "Statement of Structural Tests and Special Inspections".
    - b. A copy of the DSA 103 form is included at the end of this section.
  - 3. All testing and inspection laboratories shall be approved by DSA.
  - 4. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 5. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 6. Requirements for Contractor to provide quality-assurance and control services required by Architect, Owner, Construction Manager or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
  - 1. Divisions 02 through 33 Sections for specific test and inspection requirements.

**1.02 DEFINITIONS**

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.
- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.



- D. **Preconstruction Testing:** Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- E. **Product Testing:** Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. **Source Quality-Control Testing:** Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. **Field Quality-Control Testing:** Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. **Testing Agency:** A DSA-approved entity engaged to perform specific tests, inspections, or both. DSA-approved testing agencies shall have a current DSA Laboratory Evaluation and Acceptance (LEA) program number. Testing laboratory shall mean the same as testing agency.
- I. **Installer/Applicator/Erector:** Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
- J. **Experienced:** When used with an entity or individual, "experienced" 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.
- K. **Project Inspector:** Project Inspector employed by the School District and approved by DSA shall provide continuous inspection of the work per Title 24 CCR, Part 1, Section 4-333. The duties of the Project Inspector are defined in Title 24 CCR, Part 1, Section 4-342. "Special Inspector" and "Inspector of Record" shall mean the same as Project Inspector.

#### **1.03 CONFLICTING REQUIREMENTS**

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

#### **1.04 INFORMATIONAL SUBMITTALS**

- A. **Contractor's Statement of Responsibility:** In accordance with CBC Section 1704A.4, submit copy of written statement of responsibility sent to DSA before starting work on the following systems.
  - 1. Seismic-force resisting system, designated seismic system, or component listed in the designated seismic system quality assurance plan prepared by the Architect or the Structural Engineer of Record.
  - 2. Main wind-force resisting system or a wind-resisting component listed in the wind-force-resisting system quality assurance plan prepared by the Architect or the



Structural Engineer of Record.

#### **1.05 REPORTS AND DOCUMENTS**

- A. **Test and Inspection Reports:** Prepare and submit certified written reports where specified in other Sections. Test and inspection reports shall comply with DSA reporting requirements for testing laboratories, as indicated in DSA reporting forms and templates numbers DSA-201 through DSA-293, inclusive. Where there is no DSA reporting template, test and inspection reports shall include the following:
1. Date of issue.
  2. Project title and number.
  3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- 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, and telephone number 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 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, and telephone number 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 whether conditions, products, and installation will affect warranty.



5. Other required items indicated in individual Specification Sections.

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

**1.06 QUALITY ASSURANCE**

- A. General: 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.
- 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, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Testing Agency Qualifications: An agency with current DSA LEA program approval.
- 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 installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build mockups and site-assembled test assemblies using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.



- f. When testing is complete, remove mockups, test specimens and assemblies; do not reuse products on Project.
- 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Construction Manager.
  - 2. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
  - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
  - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 5. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.
  - 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 7. Demolish and remove mockups when directed, unless otherwise indicated.
- K. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.
- L. Room Mockups: Construct room mockups incorporating required materials and assemblies, finished according to requirements. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work. Provide room mockups of the following rooms:
- M. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections in Divisions 02 through 33.

#### **1.07 QUALITY CONTROL**

- A. Owner Responsibilities: Owner will engage one or more DSA-approved, qualified testing agencies 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 inspecting 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 required to verify that the Work complies with requirements, whether specified or not.
  - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.



2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in 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.
- E. **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.
- F. **Testing Agency Responsibilities:** Cooperate with Architect, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location 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 quality-control 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 any duties of Contractor.
- G. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.



6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
  - H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
    1. Schedule times for tests, inspections, obtaining samples, and similar activities.
  - I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
    1. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
- 1.08 SPECIAL TESTS AND INSPECTIONS**
- A. Special Tests and Inspections: Owner will engage a DSA-approved, qualified testing agency and special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in DSA Form 103, "Statement of Structural Tests and Special Inspections" attached to this Section.

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

## **PART 3 - EXECUTION**

### **3.01 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 Construction Manager's reference during normal working hours.

### **3.02 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Specification Sections 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 Division 01 Section "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 014000**



### DSA 103: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS

Application Number: 02-118150	School Name: Valley Robotics Extension Road	School District: Lodi Unified School District
DSA File Number:	Increment Number:	Date Submitted: 1/27/2020

**IMPORTANT:** This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A.

**\*\*NOTE:** Undefined section and table references found in this document are from the CBC, or California Building Code.



**DSA 103: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS)**

Application Number: 02-118150

School Name: Valley Robotics Extension  
RoadSchool District: Lodi Unified School  
District

DSA File Number:

Increment Number:

Date Submitted: 1/27/2020

**Geotechnical Reports: Project has a geotechnical report, or CDs indicate soils special inspection is required by GE**

Table 1705A.6				
1. GENERAL:	Test or Special Inspection	Type	Performed By	Code References and Notes
<div><input checked="" type="checkbox"/></div>	<div>a. Verify that:<ul style="list-style-type: none"><li>• Site has been prepared properly prior to placement of controlled fill and/or excavations for foundations.</li><li>• Foundation excavations are extended to proper depth and have reached proper material.</li><li>• Materials below footings are adequate to achieve the design bearing capacity.</li></ul></div>	Periodic	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix for exemptions.)

Table 1705A.6				
2. SOIL COMPACTION AND FILL:		Type	Performed By	Code References and Notes
	Test or Special Inspection			
<input type="checkbox"/>	a. Perform classification and testing of fill materials.	Test	LOR*	* Under the supervision of the geotechnical engineer.
<input type="checkbox"/>	b. Verify use of proper materials, densities and inspect lift thicknesses, placement and compaction during placement of fill.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (Refer to specific items identified in the Appendix for exemptions where soils SI and testing may be conducted under the supervision of a geotechnical engineer or LOR's engineering manager. In such cases, the LOR's form DSA 291 shall satisfy the soil SI and test reporting requirements for the exempt items.)
<input type="checkbox"/>	c. Compaction testing.	Test	LOR*	* Under the supervision of the geotechnical engineer. (Refer to specific items identified in the Appendix for exemptions where soils testing may be conducted under the supervision of a geotechnical engineer or LOR's engineering manager. In such cases, the LOR's form DSA 291 shall satisfy the soil test reporting requirements for the exempt items.)



# DSA 103: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS)

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3. DRIVEN DEEP FOUNDATIONS (PILES):		Table 1705A.7		
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Verify pile materials, sizes and lengths comply with the requirements.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	b. Determine capacities of test piles and conduct additional load tests as required.	Test	LOR*	* Under the supervision of the geotechnical engineer.
<input type="checkbox"/>	c. Inspect driving operations and maintain complete and accurate records for each pile.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	d. Verify locations of piles and their plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and record any pile damage.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	e. Steel piles.	Provide tests and inspections per STEEL section below.		
<input type="checkbox"/>	f. Concrete piles and concrete filled piles.	Provide tests and inspections per CONCRETE section below.		
<input type="checkbox"/>	g. For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.	*	*	* As defined on drawings or specifications.

4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS):				Table 1705A.8	
Test or Special Inspection		Type	Performed By	Code References and Notes	
<input type="checkbox"/>	a. Inspect drilling operations and maintain complete and accurate records for each pier.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix for exemptions.)	
<input type="checkbox"/>	b. Verify pier locations, diameters, plumbness, bell diameters (if applicable), lengths and embedment into	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix for exemptions.)	

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# DSA 103: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS)

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<input type="checkbox"/>	bedrock (if applicable); record concrete or grout volumes.				
<input type="checkbox"/>	c. Confirm adequate end strata bearing capacity.	Continuous	GE*		* By geotechnical engineer or his or her qualified representative. (See Appendix for exemptions.)
<input type="checkbox"/>	d. Concrete piers.	Provide tests and inspections per CONCRETE section below.			

5. RETAINING WALLS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Placement, compaction and inspection of backfill.	Continuous	GE*	1705A.6.1. * By geotechnical engineer or his or her qualified representative. (See Section 2 above).
<input type="checkbox"/>	b. Placement of soil reinforcement and/or drainage devices.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	c. Segmental retaining walls; inspect placement of units, dowels, connectors, etc.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. See DSA IR 16-3.
<input type="checkbox"/>	d. Concrete retaining walls.	Provide tests and inspections per CONCRETE section below.		
<input type="checkbox"/>	e. Masonry retaining walls.	Provide tests and inspections per MASONRY section below.		

6. OTHER SOILS:					
	Test or Special Inspection	Type	Performed By	Code References and Notes	
<input type="checkbox"/>	a. Soil Improvements	Test	GE*	Submit a comprehensive report documenting final soil improvements constructed, construction observation and the results of the confirmation testing and analysis to CGS for final	

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STATE OF CALIFORNIA



### DSA .J3: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS)

Application Number: 02-118150

School Name: Valley Robotics Extension  
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District

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Increment Number:

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				acceptance. * By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	b. Inspection of Soil Improvements	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>				



# DSA .J3: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Concrete)

## Table 1705A.3; ACI 318-14 Sections 26.12 & 26.13

Application Number: 02-118150	School Name: Valley Robotics Extension Road	School District: Lodi Unified School District
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7. CAST-IN-PLACE CONCRETE			
Material Verification and Testing:			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/> a. Verify use of required design mix.	Periodic	SI	Table 1705A.3 Item 5, 1910A.1.
<input checked="" type="checkbox"/> b. Identify, sample, and test reinforcing steel.	Test	LOR	1910A.2; ACI 318-14 Section 26.6.1.2; DSA IR 17-10. (See Appendix for exemptions.)
<input checked="" type="checkbox"/> c. During concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	Test	LOR	Table 1705A.3 Item 6; ACI 318-14 Sections 26.5 & 26.12.
<input checked="" type="checkbox"/> d. Test concrete ( $f'_c$ ).	Test	LOR	1905A.1.15; ACI 318-14 Section 26.12.
Inspection:			
<input checked="" type="checkbox"/> e. Batch plant inspection: Continuous	See Notes	SI	Default of 'Continuous' per 1705A.3.3. If approved by DSA, batch plant inspection may be reduced to 'Periodic' subject to requirements in Section 1705A.3.3.1, or eliminated per 1705A.3.3.2. (See Appendix for exemptions.)
<input type="checkbox"/> f. Welding of reinforcing steel.	Provide special inspection per STEEL, Category 19.1(d) & (e) and/or 19.2(g) & (h) below.		
8. PRESTRESSED / POST-TENSIONED CONCRETE (in addition to Cast-in-Place Concrete tests and inspections):			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> a. Sample and test prestressing tendons and anchorages.	Test	LOR	1705A.3.4, 1910A.3
<input type="checkbox"/> b. Inspect placement of prestressing tendons.	Periodic	SI	1705A.3.4, Table 1705A.3 Items 1 & 9.



# DSA .J3: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Concrete)

## Table 1705A.3; ACI 318-14 Sections 26.12 & 26.13

Application Number: 02-118150	School Name: Valley Robotics Extension Road	School District: Lodi Unified School District
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<input type="checkbox"/>	c. Verify in-situ concrete strength prior to stressing of post-tensioning tendons.	Periodic	SI	Table 1705A.3 Item 11. Special inspector to verify specified concrete strength test prior to stressing.
<input type="checkbox"/>	d. Inspect application of post-tensioning or prestressing forces and grouting of bonded prestressing tendons.	Continuous	SI	1705A.3.4, Table 1705A.3 Item 9; ACI 318-14 Section 26.13

### 9. PRECAST CONCRETE (in addition to Cast-in-Place Concrete tests and inspections):

Test or Special Inspection		Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect fabrication of precast concrete members.	Continuous	SI	ACI 318-14 Section 26.13.
<input type="checkbox"/>	b. Inspect erection of precast concrete members.	Periodic	SI*	Table 1705A.3 Item 10. * May be performed by PI when specifically approved by DSA.

### 10. SHOTCRETE (in addition to Cast-in-Place Concrete tests and inspections):

Test or Special Inspection		Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect shotcrete placement for proper application techniques.	Continuous	SI	1705A.19, Table 1705A.3 Item 7, 1908A.6, 1908A.7, 1908A.8, 1908A.9, 1908A.11, 1908A.12. See ACI 506.2-13 Section 3.4, ACI 506R-16.
<input type="checkbox"/>	b. Sample and test shotcrete ( $f'_c$ ).	Test	LOR	1908A.5, 1908A.10.

### 11. POST-INSTALLED ANCHORS:

Test or Special Inspection		Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect installation of post-installed anchors	See Notes	SI*	1617A.1.19, Table 1705A.3 Item 4a (Continuous) & 4b (Periodic), 1705A.3.8 (See Appendix for exemptions). ACI 318-14



# DSA J3: LISTING OF STRUCTURAL TESTS & SPECIFIC INSPECTIONS (Concrete)

Table 1705A.3; ACI 318-14 Sections 26.12 & 26.13

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<input type="checkbox"/> b. Test post-installed anchors.	Test	LOR	Sections 17.8 & 26.13. * May be performed by the project inspector when specifically approved by DSA.
12. OTHER CONCRETE:			
<input type="checkbox"/> Test or Special Inspection	Type	Performed By	Code References and Notes



# **DSA 103: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Masonry)** **1705A.4; TMS 602-16, Tables 3 and 4.**

**Application Number:** 02-118150      **School Name:** Valley Robotics Extension Road      **School District:** Lodi Unified School District

**DSA File Number:**      **Increment Number:**      **Date Submitted:** 1/27/2020

<b>13. STRUCTURAL MASONRY: 2000 psi</b>			
Material Verification and Testing: (See Appendix for exemptions.)			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/> a. Mill certificate indicates compliance with requirements for reinforcement, anchors, ties, fasteners and metal accessories. See item 7b for identification, sampling and testing of reinforcing steel.	Periodic	SI*	2103A.4; TMS 602-16 Articles 1.5B.2 & 2.4. *To be performed by qualified LOR representative. Applicable testing by LOR. See DSA IR 17-10 for unidentified reinforcing steel.
<input checked="" type="checkbox"/> b. Producer's certificate of compliance for masonry units, mortar and grout materials.	Test	LOR	1705A.4, 2103A.2.1, 2103A.3, 2103A.5; TMS 602-16 Articles 2.1, 2.2, 2.6A and 2.6B, and Table 6 footnote 3.
<input checked="" type="checkbox"/> c. Test masonry ( $f'_m$ ).	Test	LOR	1705A.4. For Unit Strength: 2105A.3 (2114.6.1"); TMS 602-16 Articles 1.4B.2, 1.5B.1 & 1.5B.2. For Prism (required when $f'_m > 2000$ psi): 2105A.2; TMS 602-16 Articles 1.4B.3, 1.4B.4, 1.5B.1 & 1.5B.2.
<input checked="" type="checkbox"/> d. Verify proportions of site-prepared, premixed or preblended mortar and grout.	Periodic	SI	TMS 602-16 Table 3 Item 5, Table 4 Item 1a & 2d.
<input checked="" type="checkbox"/> e. Test core-drilled samples.	Test	LOR	2105A.4. (See Appendix for exemptions.)
Inspection: (See Appendix for exemptions.)			
<input type="checkbox"/> f. Inspect preparation of prisms.	Continuous	SI	TMS 602-16 Articles 1.4.B.3 & 1.4.B.4 & Table 4 Item 4.
<input checked="" type="checkbox"/> g. Verify size, location and condition of all dowels, construction supporting masonry, etc.	Periodic	SI	



# **DSA 103: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Masonry)** **1705A.4; TMS 602-16, Tables 3 and 4.**

**Application Number:** 02-118150      **School Name:** Valley Robotics Extension Road      **School District:** Lodi Unified School District

**DSA File Number:**      **Increment Number:**      **Date Submitted:** 1/27/2020

<input checked="" type="checkbox"/>	h. Verify size, grade and type of reinforcement and anchor bolts.	Periodic	SI	TMS 602-16 Table 4 Item 1c.
<input type="checkbox"/>	i. Welding of reinforcing steel.	TMS 602-16 Table 4 Item 3e. Provide special inspection per STEEL, Category 19.1(d) & (e) and/or 19.2(g) & (h) below.		
<input checked="" type="checkbox"/>	j. Inspect placement of reinforcement and connectors.	Continuous	SI	TMS 602-16 Table 4 Item 2c.
<input checked="" type="checkbox"/>	k. Inspect placement of masonry units and construction of mortar joints.	Periodic	SI	TMS 602-16 Table 4 Item 3b.
<input checked="" type="checkbox"/>	l. Verify preparation, construction and protection of masonry during cold weather (temperature below 40° F) or hot weather (temperature above 90° F).	Periodic	SI*	TMS 602-16 Table 4 Item 3f. * May be performed by the project inspector when specifically approved by DSA.
<input checked="" type="checkbox"/>	m. Inspect type, size and location of anchors and all other items to embedded in masonry including other details of anchorage of masonry to structural members, frames and other construction.	Continuous	SI	TMS 602-16 Table 4 Item 3d.
<input checked="" type="checkbox"/>	n. Inspect grout space prior to placement of grout.	Continuous	SI	TMS 602-16 Table 4 Item 2a.

## **14. VENEER OR GLASS BLOCK PARTITIONS: 1705A.4.1; TMS 602-16 Tables 3 and 4.**

Test or Special Inspection		Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Verify proportions of site-prepared mortar and grout and/or verify certification of premixed mortar.	Periodic	SI	TMS 602-16 Table 3 Item 5 and Table 4 Items 1a & 2d.
<input type="checkbox"/>	b. Inspect placement of units and construction of mortar joints.	Periodic	SI	TMS 602-16 Table 4 Item 3b.

DGS DSA 103 (Issued 12/2019)

DIVISION OF THE STATE ARCHITECT

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# **DSA .J3: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Masonry)** **1705A.4; TMS 602-16, Tables 3 and 4.**

**Application Number:** 02-118150      **School Name:** Valley Robotics Extension Road      **School District:** Lodi Unified School District  
**DSA File Number:**      **Increment Number:**      **Date Submitted:** 1/27/2020

<input type="checkbox"/>	c. Inspect placement of reinforcement, connectors and anchors.	Periodic	SI	TMS 602-16 Table 4 Item 2c.
<input type="checkbox"/>	d. Inspect type, size and location of anchors and all other items to be embedded in masonry including details of anchorage of masonry to structural members, frames and other construction.	Periodic	SI	TMS 602-16 Table 4 Item 3d.
<input type="checkbox"/>	e. Verify preparation, construction and protection of masonry during cold weather (temperature below 40° F) or hot weather (above 90° F).	Periodic	SI*	TMS 602-16 Table 4 Item 3f. * May be performed by the project inspector when specifically approved by DSA.
<input type="checkbox"/>	f. Test veneer bond strength.	Test	LOR	1410.2.1; TMS 402 Article 12.3.2.4. (Field constructed mock-up laboratory tested in accordance with ASTM C482).
<b>15. POST-INSTALLED ANCHORS IN MASONRY:</b>				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect installation of post-installed anchors	See Notes	SI*	1617A.1.19, 1705A.4, Table 1705A.3 Item 4a (Continuous) & 4b (Periodic); ACI 318-14 Sections 17.8 & 26.13. * May be performed by the project inspector when specifically approved by DSA. (See Appendix for exemptions.)
<input type="checkbox"/>	b. Test post-installed anchors.	Test	LOR	1705A.4, 1910A.5. (See Appendix for exemptions.)
<b>16. OTHER MASONRY:</b>				
	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>				



### DSA .J3: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (KEY TO COLUMN)

Application Number: 02-118150

School Name: Valley Robotics Extension  
Road

School District: Lodi Unified School  
District

DSA File Number:

Increment Number:

Date Submitted: 1/27/2020

#### KEY TO COLUMNS

1. TYPE	2. PERFORMED BY
<b>Continuous</b> – Indicates that a continuous special inspection is required	<b>GE</b> – Indicates that the special inspection shall be performed by a registered geotechnical engineer or his or her authorized representative.
<b>Periodic</b> – Indicates that a periodic special inspection is required	<b>LOR</b> – Indicates that the test or special inspection shall be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program. See CAC Section 4-335.
<b>Test</b> – Indicates that a test is required	<b>PI</b> – Indicates that the special inspection may be performed by a project inspector when specifically approved by DSA.
	<b>SI</b> – Indicates that the special inspection shall be performed by an appropriately qualified/approved special inspector.

Name of Architect or Engineer in general responsible charge:

Anthony Harris

Name of Structural Engineer (When structural design has been delegated):

Daniel Wang, S.E.

Signature of Architect or Structural Engineer:

Date:

1/27/20



# Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

Application Number: 02-118150

School Name: Valley Robotics Extension Road

School District: Lodi Unified School District

DSA File Number:

Increment Number:

Date Submitted: 1/27/2020

Exempt items given in DSA IR A-22 or the 2019 CBC (including DSA amendments) and those items identified below with an "X" by the design professional are NOT subject to DSA requirements for the structural tests / special inspections noted. **Items marked as exempt shall be identified on the approved construction documents.** The project inspector shall verify all construction complies with the approved construction documents.

	SOILS:
<input type="checkbox"/>	1. Deep foundations acting as a cantilever footing designed based on minimum allowable pressures per CBC Table 1806A.2 and having no geotechnical report for the following cases: A) free standing sign or scoreboard, B) cell or antenna towers and poles less than 35'-0" tall (e.g., lighting poles, flag poles, poles supporting open mesh fences, etc.), C) single-story structure with dead load less than 5 psf (e.g., open fabric shade structure), or D) covered walkway structure with an apex height less than 10'-0" above adjacent grade.
<input checked="" type="checkbox"/>	2. Shallow foundations, etc. are exempt from special inspections and testing by a Geotechnical Engineer for the following cases: A) buildings without a geotechnical report and meeting the exception Item #1 criteria in CBC Section 1803A.2 supported by native soil (any excavation depth) or fill soil (not exceeding 12" depth per CBC, Section 1804A.6), B) soil scarification/recompaction not exceeding 12" depth, C) native or fill soil supporting exterior non-structural flatwork (e.g., sidewalks, site concrete ramps, site stairs, parking lots, driveways, etc.), D) unpaved landscaping and playground areas, or E) utility trench backfill.

	CONCRETE/MASONRY:
<input type="checkbox"/>	1. Post-installed anchors for the following: A) exempt non-structural components (e.g., mechanical, electrical, plumbing equipment - see Item 7 for "Welding") given in CBC Section 1617A.1.18 (which replaces ASCE 7-16, Section 13.1.4) or B) interior nonstructural wall partitions meeting criteria listed in exempt Item 3 for "Welding."
<input type="checkbox"/>	2. Concrete batch plant inspection is not required for items given in CBC Section 1705A.3.3.2 subject to the requirements and limitations in that section.
<input type="checkbox"/>	3. Non-bearing non-shear masonry walls may be exempt from certain DSA masonry testing and special inspection items as allowed per DSA IR 21-1. Refer to construction documents for specific exemptions accordingly for each applicable wall condition.
<input checked="" type="checkbox"/>	4. Epoxy shear dowels in site flatwork and/or other non-structural concrete.
<input checked="" type="checkbox"/>	5. Testing of reinforcing bars is not required for items given in CBC Section 1910A.2 subject to the requirements and limitations in that section.

DGS DSA 103 (Issued 12/2019)

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## Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

Application Number: 02-118150

School Name: Valley Robotics Extension  
Road

School District: Lodi Unified School  
District

DSA File Number:

Increment Number:

Date Submitted: 1/27/2020

	<b>Welding:</b>
<input checked="" type="checkbox"/>	1. Solid-clad and open-mesh gates with maximum leaf span or rolling section for rolling gates of 10' and apex height less than 8'-0" above lowest adjacent grade. When located above circulation or occupied space below, these gates are not located within 1.5x gate/fence height (max 8'-0") to the edge of floor or roof.
<input checked="" type="checkbox"/>	2. Handrails, guardrails and modular or relocatable ramps associated with walking surfaces less than 30" above adjacent grade (excluding post base connections per the 'Exception' language in Section 1705A.2.1); fillet welds shall not be ground flush.
<input type="checkbox"/>	3. Non-structural interior cold-formed steel framing spanning less than 15'-0", such as in interior partitions, interior soffits, etc. supporting only self weight and light-weight finishes or adhered tile, masonry, stone, or terra cotta veneer no more than 5/8" thickness and apex less than 20'-0" in height and not over an exit way. Maximum tributary load to a member shall not exceed the equivalent of that occurring from a 10'x10' opening in a 15' tall wall for a header or king stud.
<input type="checkbox"/>	4. Manufactured support frames and curbs using hot rolled or cold-formed steel (i.e., light gauge) for mechanical, electrical, or plumbing equipment weighing less than 2000# (equipment only) (connections of such frames to superstructure elements using welding will require special inspection as noted in selected item(s) for Sections 19, 19.1 and/or 19.2 of listing above).
<input type="checkbox"/>	5. Manufactured components (e.g., Tolco, B-Line, Afcon, etc.) for mechanical, electrical, or plumbing hanger support and bracing (connections of such components to superstructure elements using welding will require special inspection as noted in selected item(s) for Sections 19, 19.1 and/or 19.2 of listing above).
<input type="checkbox"/>	6. TV Brackets, projector mounts with a valid listing (see DSA IR A-5) and recreational equipment (e.g., playground structures, basketball backstops, etc.) (connections of such elements to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 located in the Steel/Aluminum category).
<input checked="" type="checkbox"/>	7. Any support for exempt non-structural components given in CBC Section 1617A.1.18 (which replaces ASCE 7-16, Section 13.1.4) meeting the following: A) when supported on a floor/roof, <400# and resulting composite center of mass (including component's center of mass) ≤4' above supporting floor/roof, B) when hung from a wall or roof/floor, <20# for discrete units or <5 plf for distributed systems.



### DSA .J3: LIST OF REQUIRED VERIFIED REPORTS

Application Number: 02-118150	School Name: Valley Robotics Extension Road	School District: Lodi Unified School District
DSA File Number:	Increment Number:	Date Submitted: 1/27/2020
1. Soils Testing and Inspection: Geotechnical Verified Report Form DSA 293		
2. Structural Testing and Inspection: Laboratory Verified Report Form DSA 291		
3. Concrete Batch Plant Inspection: Laboratory Verified Report Form DSA 291		
4. Masonry Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292		



**SECTION 01 5000  
TEMPORARY FACILITIES AND CONTROLS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections:
  - 1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.
  - 2. Division 01 Section "Closeout Procedures" for final cleaning requirements and for cleaning permanent HVAC ducts used during construction.
  - 3. Division 01 Section "Construction Waste Management and Disposal" for requirements for project waste materials.

**1.02 DEFINITIONS**

- A. Project Completion: Final Completion.

**1.03 USE CHARGES**

- A. General: Installation and removal of and use charges for ALL temporary facilities shall be paid by Contractor and to be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
  - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
- D. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- E. Dust-Control and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust-control and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
  - 1. Locations of dust-control partitions at each phase of the work.
  - 2. Location of proposed air filtration system discharge.
  - 3. Other dust-control measures.
  - 4. Waste management plan.

**1.05 QUALITY ASSURANCE**



- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with CEC.
- 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 accessibility provisions in the following documents:
  - 1. As indicated on drawings.
  - 2. 2019 CBC Chapter 11B.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete or galvanized steel bases for supporting posts. Provide windscreen.

### **2.02 TEMPORARY FACILITIES**

- A. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, Construction Manager, and construction personnel office activities and to accommodate project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
  - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
  - 2. Conference room of sufficient size to accommodate meetings of ten individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
  - 3. Project Testing & Inspection Office: Provide separate lockable room for use by Owner and Owner's Inspector of Record. Provide (2) tables, chair and file cabinet. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Provide separate outside phone line with DSL connectivity.
  - 4. Drinking water and private toilet.
  - 5. Coffee machine and supplies.
  - 6. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
  - 7. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
- 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.

### **2.03 EQUIPMENT**

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Permanent HVAC System: If Owner, at Contractor request, authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system, remove at end of construction and clean HVAC system as



required in Division 01 Section "Closeout Procedures".

### **PART 3 - EXECUTION**

#### **3.01 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 Division 01 Section "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.

#### **3.02 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. Sanitary Facilities: Provide temporary toilets, wash 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.
- C. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - 1. Install electric power service overhead, unless otherwise indicated.
- D. 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.
- E. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access project electronic documents and maintain electronic communications. Equip computer with not less than the following:
  - 1. Processor: Intel Pentium D or Intel CoreDuo, 3.0 GHz processing speed.
  - 2. Memory: 4 gigabyte.
  - 3. Disk Storage: 300 gigabyte hard-disk drive and combination DVD-RW/CD-RW drive.
  - 4. Display: 19-inch (480-mm) LCD monitor with 128 Mb dedicated video RAM.
  - 5. Full-size keyboard and mouse.
  - 6. Network Connectivity: 10/100BaseT Ethernet.
  - 7. Operating System: Microsoft Windows XP Professional or Microsoft Windows Vista Business.
  - 8. Productivity Software:
    - a. Microsoft Office Professional, XP or higher, including Word, Excel, and Outlook.
    - b. Adobe Reader 7.0 or higher.
  - 9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these 3 functions.
  - 10. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum 384 Kbps upload and 1 Mbps download speeds at each computer.



11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing and spam protection in a combined application.

### **3.03 SUPPORT FACILITIES INSTALLATION**

- A. General: Comply with the following:
  1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
- B. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
  1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
  3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
  4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."
  5. Delay installation of seal coats for hot-mix asphalt pavement until immediately before Project Completion. Repair hot-mix asphalt pavement before installation of seal coats according to Division 32 Section "Asphalt Paving."
- C. 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.
- D. Parking: Provide temporary parking areas for construction personnel.
- E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  1. 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 touchup signs so they are legible at all times.
- F. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "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 Division 01 Section "Execution" for progress cleaning requirements.
- 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.

### **3.04 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.
- 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 Division 01 Section "Summary."
- C. 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 erosion- and sedimentation-control Drawings, requirements of 2003 EPA Construction General Permit, California State Water Resources Control Board and local authorities having jurisdiction, whichever is more stringent, and requirements specified in Division 31 Section "Site Clearing".
  - 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 the project site during the course of the project.
  - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. 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.
- E. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
  - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations, unless otherwise indicated on Drawings.
  - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
- F. 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 work day.
- G. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- H. 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.
  - 1. Prohibit smoking in construction areas.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.



4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

### **3.05 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. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Project 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 Project 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.
  3. At Project Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

**END OF SECTION 015000.00**



**SECTION 01 5639  
TEMPORARY TREE AND PLANT PROTECTION**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Tree protection of existing trees and plants
- B. Tree pruning of existing trees

**1.02 RELATED REQUIREMENTS**

- A. Division 01 Section - Temporary Facilities and Controls
- B. Division 31 Section - Site Clearing
- C. Division 32 Section - Landscape Work

**1.03 DEFINITIONS**

- A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100-mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.
- D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

**1.04 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of the following:
  - 1. Organic Mulch: 1-pint (0.5-L) 1-quart (1-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
  - 2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
  - 3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
  - 1. Species and size of tree.
  - 2. Location on site plan. Include unique identifier for each.
  - 3. Reason for pruning.
  - 4. Description of pruning to be performed.
  - 5. Description of maintenance following pruning.
- D. Qualification Data: For qualified arborist and tree service firm.
- E. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- F. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.



- G. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

#### **1.05 QUALITY ASSURANCE**

- A. Arborist Qualifications:

1. Certified Arborist as certified by ISA.
2. Licensed Arborist in jurisdiction where Project is located.

- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

- C. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
  - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
  - b. Enforcing requirements for protection zones.
  - c. Arborist's responsibilities.
  - d. Contractor responsibilities
  - e. Field quality control.

#### **1.06 PROJECT CONDITIONS**

- A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or trenching or digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
8. Do not direct vehicle or equipment exhaust toward protection zones.
9. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) Insert dimension in diameter; and free of weeds, roots, and toxic and other nonsoil materials.



1. Obtain topsoil only from well-drained sites where topsoil is 4 inches (100 mm) deep or more; do not obtain from bogs or marshes.
2. Refer to Section 32 Landscape Work for material requirements.
- B. Topsoil: Stockpiled topsoil from location shown on Drawings.
- C. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
  1. Type: Wood and bark chips.
  2. Size Range: 1/2" inch minimum, 1" maximum.
  3. Color: Natural.
- D. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements. Previously used materials may be used when approved by Architect.
  1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch (50-mm) opening, 0.148-inch- (3.76-mm-) diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- (60-mm-) OD line posts, and 2-7/8-inch- (73-mm-) OD corner and pull posts; with 1-5/8-inch- (42-mm-) OD top rails and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
    - a. Height: 6 feet (1.8 m).
    - b. Polymer-Coating Color: Black.
  2. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches (914 mm)
- E. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
  1. Size: as required
  2. Text: "TREE PROTECTION ZONE - KEEP OUT. No unauthorized entry. No storage of vehicles, materials, or debris. No dumping of chemicals, slurry, paint, oil, etc. "
  3. Lettering: 3-inch (75-mm-)high minimum, black characters on white background.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

### **3.02 PREPARATION**

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag - Tie a 1-inch (25-mm) blue-vinyl tape around each tree trunk at 54 inches (1372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.



1. Apply 3-inch (100-mm) average thickness of organic mulch. Do not place mulch within 6 inches (150 mm) of tree trunks.

### 3.03 TREE- AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
  1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
  2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
  3. Access Gates: Install as required; adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 35 feet (10.5 m) on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
- E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
  1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
  2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

### 3.04 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Division 31 Section "Earth Moving."
- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only roots smaller than 2" in diameter that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist



condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

### **3.05 ROOT PRUNING**

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
  - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
  - 2. Cut Ends: Do not paint cut root ends. Coat cut ends of roots more than 1-1/2 inches (38 mm) in diameter with emulsified asphalt or other coating formulated for use on damaged plant tissues as approved by the arborist.
  - 3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
  - 4. Cover exposed roots with burlap and water regularly.
  - 5. Backfill as soon as possible according to requirements in Division 31 Section "Grading"
- B. Root Pruning at Edge of Protection Zone: Prune roots 12 inches (300 mm) outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

### **3.06 CROWN PRUNING**

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
  - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
  - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:
    - a. Type of Pruning: Cleaning Thinning Raising Reduction.
  - 3. Cut branches with sharp pruning instruments; do not break or chop.
  - 4. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.

### **3.07 REGRADING**

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
  - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.



- D. Minor Fill within Protection Zone: Where existing grade is 4 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

### **3.08 FIELD QUALITY CONTROL**

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

### **3.09 REPAIR AND REPLACEMENT**

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
  - 1. Submit details of proposed root cutting and tree and shrub repairs.
  - 2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
  - 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
  - 4. Perform repairs within 24 hours.
  - 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Trees: Remove and replace trees indicated to remain that are more than 66 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
  - 1. Provide new trees of same size and species as those being replaced for each tree that measures 4 inches (100 mm) or smaller in caliper size.
  - 2. Provide one new tree(s) of 6-inch (150-mm) caliper size for each tree being replaced that measure more than 4 inches (100 mm) in caliper size.
    - a. Species: Species selected by Architect.
  - 3. Plant and maintain new trees as specified in Division 32 Section "Landscape Work"
- C. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Drill 2-inch (50-mm-) diameter holes a minimum of 12 inches (300 mm) deep at 24 inches (600 mm) O.C. Backfill holes with an equal mix of native soil and sand.

### **3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

**END OF SECTION**



**SECTION 01 5713  
TEMPORARY EROSION AND SEDIMENT CONTROL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.
- D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 1000 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.
- B. Section 31 2200 - Grading: Temporary and permanent grade changes for erosion control.

**1.03 REFERENCE STANDARDS**

- A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc-Type Apparatus.
- B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity..
- C. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
- D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
- E. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile.
- F. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.
- G. California State Water Resources Control Board, Construction General Permit; current edition.
- H. California Stormwater Quality Association (CASQA), California Stormwater Best Management Practice (BMP) Handbook; current edition.
- I. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Comply with all requirements of agencies for erosion and sedimentation control, even though this project is not required by law to comply.
- B. Best Management Practices Standard: CASQA Stormwater BMP Handbook.
- C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
  - 1. Owner shall obtain permits and pay for securities required by authority having jurisdiction.
  - 2. Owner shall withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.



- D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
  - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
- F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
  - 1. Control movement of sediment and soil from temporary stockpiles of soil.
  - 2. Prevent development of ruts due to equipment and vehicular traffic.
  - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
  - 1. Prevent windblown soil from leaving the project site.
  - 2. Prevent tracking of mud onto public roads outside site.
  - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
  - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- H. Open Water: Prevent standing water that could become stagnant.
- I. Maintenance: Maintain temporary preventive measures until permanent measures have been established.
- J. Penalties and Fines: The Contractor is responsible for all penalties and fines assessed to or levied on the project related to stormwater management.

#### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Maintenance Instructions: Provide instructions covering inspection and maintenance for temporary measures that must remain after Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Use materials that conform to California Stormwater Quality Association (CASQA) and the California Stormwater Best Management Practice (BMP) Handbook, current edition.
- B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

#### **3.02 PREPARATION**

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.



### **3.03 INSTALLATION**

- A. The Contractor shall implement preventative measures in accordance with the Erosion Control Plan and as required by the State Water Board.
- B. Temporary Seeding:
  - 1. When hydraulic seeder is used, seedbed preparation is not required.
  - 2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
  - 3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
  - 4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
  - 5. Incorporate fertilizer into soil before seeding.
  - 6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.
  - 7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
  - 8. Repeat irrigation as required until grass is established.

### **3.04 MAINTENANCE**

- A. Inspect preventive measures as required by the Erosion Control Plan and the State Water Board.
- B. Repair deficiencies immediately.
- C. Clean out temporary sediment control structures and relocate soil on site.
- D. Place sediment in appropriate locations on site; do not remove from site.

### **3.05 CLEAN UP**

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by the Owner's representative.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

**END OF SECTION**



## **SECTION 01 6000 PRODUCT REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.01 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 012500 "Substitution Procedures".
  - 2. Section 013300 "Submittal Procedures".
  - 3. Section 014010 "DSA Quality Requirements".
  - 4. Section 014213 "Abbreviations, Symbols and Acronyms" for applicable industry standards for products specified.

#### **1.02 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, which is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### **1.03 ACTION SUBMITTALS**

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles. **Read PART 3 carefully.**
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."



- b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

#### **1.04 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.

#### **1.05 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 to determine that products are undamaged and properly protected.

- C. Storage:

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

#### **1.06 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 warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.



2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for 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. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

#### **1.07 CLOSEOUT SUBMITTALS**

- A. Contractor and subcontractors shall certify that no asbestos containing materials and no lead base paint were used in this project. Certification letter must be addressed to Owner, including project and Contractors' information; to be notarized.

### **PART 2 - PRODUCTS**

#### **2.01 NON- ASBESTOS PRODUCTS**

- A. No asbestos or asbestos containing materials or lead base paint may be used in this project or in any tools, devices, clothing or equipment used to affect this construction. All work or materials found to contain asbestos, or material installed with asbestos containing equipment or lead base paint will be immediately rejected and this work will be removed by a certified EPA hazard material Contractor under the supervision of a certified hazard material consultant at no additional cost to Owner.

#### **2.02 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 not in conflict with 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 "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
  1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.



3. Products:
  - a. Restricted List: 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.
4. Manufacturers:
  - a. Restricted List: 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.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and 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.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## **2.03 COMPARABLE PRODUCTS**

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
  1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  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.

## **PART 3 - EXECUTION**

### **3.01 CONTRACT DOCUMENT REVISIONS**

- A. Should a Contractor-initiated proposed substitution, alternative sequence, method of construction, products listed or equivalent other than the Basis of Design product shown involves engineering, feasibility, scope or cost, that require a revision of the Contract



Drawings or Specifications for the purpose of obtaining review and approval by Authorities Having Jurisdiction (AHJ), the Contractor accepts and agrees to the following:

1. Services of the Architect, his consultants, and / or other District's consultants who are the responsible design professionals, for researching and reporting on proposed substitutions or alternative sequence and method of construction shall be paid by Contractor in Time and Materials basis.
2. Costs related to the Services by the Architect, his consultants, and / or other District's consultants who are the responsible design professionals, for any expenses such as, but not limited to reproduction, long distance telephone, traveling and shipping costs, to be reimbursable at cost plus usual and customary mark-up for handling and billing.
3. Such fees shall be paid by Contractor whether or not the proposed substitution or alternative sequence or method of construction is ultimately accepted by Authorities Having Jurisdiction (AHJ) and / or the District.
4. Such fees shall be paid from Contractor's portion of savings from the proposed change, if a net reduction in Contract Sum results. If fees exceed Contractor's portion of net reduction, Contractor shall pay all remaining fees.

**END OF SECTION 016000**



**SECTION 01 7300  
EXECUTION**

**PART 1 - GENERAL**

**1.01 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. Progress cleaning.
  - 6. Starting and adjusting.
  - 7. Protection of installed construction.
  - 8. Correction of the Work.
- B. Related Sections:
  - 1. Division 01 Section "Submittal Procedures" for submitting surveys.
  - 2. Division 01 Section "DSA Quality Control" for testing and inspection procedures.
  - 3. Division 01 Section "Construction Waste Management and Disposal" for waste disposal procedures.

**1.02 DEFINITIONS**

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

**1.03 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For land surveyor.
- B. Certified Surveys: Submit four copies signed by land surveyor.
- C. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

**1.04 QUALITY ASSURANCE**

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified and licensed to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Architect, through Construction Manager, of locations and details of cutting and await directions from the Architect before proceeding. Shore, brace, and support structural element 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. Mechanical systems piping and ducts.
  - f. Control systems.
  - g. Communication systems.
  - h. Fire-detection and -alarm systems.
  - i. Conveying systems.
  - j. Electrical wiring systems.
  - k. Operating systems of special construction.
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. Exterior curtain-wall construction.
  - d. Sprayed fire-resistive material.
  - e. Equipment supports.
  - f. Piping, ductwork, vessels, and equipment.
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.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. General: 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 the Architect, through Construction



Manager, for the visual and functional performance of in-place materials.

### **PART 3 - EXECUTION**

#### **3.01 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, mechanical and electrical systems, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  - 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. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
- 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.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
  - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

#### **3.02 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 caused by differing field conditions outside the control of the Contractor, submit a request for information according to requirements in Division 01 Section "Project Management and Coordination."



### 3.03 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as 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 and Construction Manager 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 and Construction Manager.

### 3.04 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 or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
- C. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

### 3.05 INSTALLATION

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



2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces and at all means of egress.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: 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.
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. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### **3.06 CUTTING AND PATCHING**

- A. Cutting and Patching, 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. 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.



- D. Temporary Support: Provide temporary support of work to be cut.
- E. 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.
- F. 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 of Division 01 Section "Summary."
- G. 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 prevent unscheduled interruption to occupied areas.
- H. 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 and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 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.
- I. 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. 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 minimize 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. Provide additional coats until patch blends with adjacent surfaces.

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

- J. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### **3.07 OWNER-INSTALLED PRODUCTS**

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
  1. 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.

### **3.08 PROGRESS CLEANING**

- A. General: 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 (27 deg C).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Utilize containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where more than one installer has worked.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Project 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 Division 01 Section "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 Project Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### **3.09 STARTING AND ADJUSTING**

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "DSA 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 Project Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.
- C. Limiting Exposures: Supervise construction operations to ensure that no part of the Work, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
  - 1. Excessive static or dynamic loading.
  - 2. Excessive internal or external pressures.
  - 3. Excessively high or low temperatures.
  - 4. Thermal shock.
  - 5. Excessively high or low humidity.
  - 6. Pollution and air contamination.
  - 7. Water or ice.
  - 8. Chemicals and solvents.
  - 9. Light.
  - 10. Radiation.
  - 11. Puncture.
  - 12. Abrasion.
  - 13. Heavy traffic.
  - 14. Soiling, staining, and corrosion.



15. Bacteria.
16. Rodent and insect infestation.
17. Combustion.
18. Electrical current.
19. High-speed operation.
20. Improper lubrication.
21. Unusual wear or other misuse.
22. Contact between incompatible materials.
23. Destructive testing.
24. Misalignment.
25. Excessive weathering.
26. Unprotected storage.
27. Improper shipping or handling.
28. Theft or vandalism.

### **3.11 CORRECTION OF THE WORK**

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

**END OF SECTION 017300.00**



**SECTION 01 7419  
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 - GENERAL**

**1.01 SUMMARY**

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

**1.02 DEFINITIONS**

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

**1.03 PERFORMANCE REQUIREMENTS**

- A. General: Achieve end-of-Project rates for salvage/recycling of **75**-percent by weight of total non-hazardous 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, including the following:
  - 1. Demolition Waste:
    - a. Asphalt paving.
    - b. Concrete.
    - c. Concrete reinforcing steel.
    - d. Concrete masonry units.
    - e. Switchgear and panelboards.
    - f. Transformers.
  - 2. Construction Waste:
    - a. Masonry and CMU.
    - b. Lumber.
    - c. Wood sheet materials.
    - d. Wood trim.
    - e. Metals.
    - f. Roofing.
    - g. Insulation.
    - h. Carpet and pad.
    - i. Gypsum board.



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

#### **1.04 ACTION SUBMITTALS**

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

#### **1.05 INFORMATIONAL SUBMITTALS**

- A. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- B. 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.
- C. 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.

#### **1.06 QUALITY ASSURANCE**

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

#### **1.07 WASTE MANAGEMENT PLAN**

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.

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

### **PART 3 - EXECUTION**

#### **3.01 PLAN IMPLEMENTATION**

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.



1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. 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.
- C. 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, recycled, reused, donated, and sold.
  2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### **3.02 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 be shared equally by Owner and 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.

### **3.03 RECYCLING DEMOLITION WASTE**

- A. Asphalt Paving: Grind asphalt to maximum 1-1/2-inch (38-mm) size.
- B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
  1. Pulverize concrete to maximum 1-1/2-inch (38-mm) size.



2. Crush concrete and screen to comply with requirements in Section 312000 "Earth Moving" for use as satisfactory soil for fill or subbase.

### **3.04 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.**

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

### **3.05 DISPOSAL OF WASTE**

#### **A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.**

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

#### **B. Burning: Do not burn waste materials.**

#### **C. Disposal: Remove waste materials from Owner's property and legally dispose of them.**

### **3.06 ATTACHMENTS**

- A. Form CWM-1 for construction waste identification.
- B. Form CWM-2 for demolition waste identification.

**END OF SECTION 017419**



**SECTION 01 7800  
CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

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

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  - 2. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Addenda.
  - 3. Change Orders and other modifications to the Contract.
  - 4. Reviewed shop drawings, product data, and samples.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.



- E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  - 1. Measured depths of foundations in relation to finish first floor datum.
  - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

### **3.02 OPERATION AND MAINTENANCE DATA**

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

### **3.03 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

### **3.04 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.



- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.
- F. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

**END OF SECTION**



**SECTION 01 7823  
OPERATION AND MAINTENANCE DATA**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Product maintenance manuals.
  - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

**1.02 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.

**1.03 CLOSEOUT SUBMITTALS**

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect and Commissioning Authority will comment on whether content of operations and maintenance submittals are acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
  - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
    - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    - b. Enable inserted reviewer comments on draft submittals.
  - 2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect, through Construction Manager, will return two copies.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

**PART 2 - PRODUCTS**



## **2.01 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
  - 1. List of documents.
  - 2. List of systems.
  - 3. List of equipment.
  - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- 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."

## **2.02 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS**

- A. Organization: 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. **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:** Enable bookmarking of 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.
- F. **Manuals, Paper Copy:** Submit manuals in the form of hard copy, bound and labeled volumes.
  - 1. **Binders:** Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
  - 2. **Dividers:** Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  - 3. **Protective Plastic Sleeves:** Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
  - 4. **Supplementary Text:** Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
  - 5. **Drawings:** Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 2.03 EMERGENCY MANUALS

- A. **Content:** Organize manual into a separate section for each of the following:



1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- B. 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.
- C. 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.
- D. 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.

#### **2.04 OPERATION MANUALS**

- A. 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.
- B. 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.
- C. 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.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## **2.05 PRODUCT MAINTENANCE MANUALS**

- A. 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.
- B. 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.
- C. 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.
- D. 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.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. 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.

## **2.06 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS**

- A. 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 warranty and bond information, as described below.
- B. 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.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  1. Standard maintenance instructions and bulletins.
  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.
- D. 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.
- E. 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.
- F. 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.



- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- 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.

### **PART 3 - EXECUTION**

#### **3.01 MANUAL PREPARATION**

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. 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.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 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.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, 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.
  - 1. 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.
- F. 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 operation and maintenance manuals.
  - 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."
- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

**END OF SECTION 017823**



**SECTION 01 7839  
PROJECT RECORD DOCUMENTS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings:
    - a. Marked-Up Record Prints.
    - b. Scanned PDF Electronic Files of Marked-Up Record Prints.
  - 2. Record Specifications.
  - 3. Record Contract Modification Documents.
- B. Related Sections:
  - 1. Division 01 Section "Submittal Procedures" for general submittal procedures and for definition of PDF electronic file format.
  - 2. Division 01 Section "Closeout Procedures" for general closeout procedures.
  - 3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 4. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

**1.02 CLOSEOUT SUBMITTALS**

- A. Record Drawings. Comply with the following:
  - 1. Marked-Up Record Prints. Submit paper copies of record Drawings as follows:
    - a. Initial Submittal: Submit one paper set of marked-up record prints. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal: Make all corrections, changes and additions from marked-up record prints. Submit one paper set of final marked-up record prints.
  - 2. Scanned PDF Electronic Files of Marked-Up Record Prints. Submit electronic copies of record Drawings as follows:
    - a. Final Submittal: Submit three scanned PDF electronic file copies of final marked-up record prints.
- B. Record Specifications (Project Manual): Submit copies of final project specifications as follows:
  - 1. Initial Submittal: Submit one paper set of updated project specifications. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
  - 2. Final Submittal: Make all corrections, changes and additions from marked-up specifications. Submit one paper set and three scanned PDF electronic file copies of final marked-up specifications.
- C. Record Contract Modification Documents: Submit copies of all contract modification documents relating to the physical work, including Addenda, Construction Change Directives, RFI's, ASI's and other contract modifications as follows:
  - 1. Initial Submittal: Submit one paper set of marked-up contract modification documents. Architect will indicate whether general scope of changes, additional information



recorded, and quality of drafting are acceptable.

2. Final Submittal: Make all corrections, changes and additions from marked-up contract modification documents. Submit one paper set and three scanned PDF electronic file copies of final marked-up specifications.
- D. Monthly Reviews: Review job-site copy of record marked-up prints concurrent with submittal of application for payment. Demonstrate that change items are incorporated in Project record documents concurrent with progress of the Work, including modifications, RFI's, ASI's, CCD's, concealed conditions, field changes, product selections, and other notations.

## **PART 2 - PRODUCTS**

### **2.01 RECORD DRAWINGS**

- A. Marked-Up Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings as follows:
  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 archive 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 below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders, including RFI's and ASI's.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record sets with erasable, red-colored pencil. Use 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, RFI numbers, ASI numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
  7. Prepare a full set of corrected marked-up record prints of the Contract Drawings after conducting a final review of the marked-up record prints with Architect and Construction Manager:
    - a. Conduct the final review immediately before inspection for Preliminary Completion.
- B. Record Digital Data Files: After final review and preparation of the marked-up record prints and when authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable. Refer instances of uncertainty to Architect, through Construction Manager for resolution
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location (lower right hand corner of sheet):
1. Marked-Up Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file[ with comment function enabled].
  3. Scanned PDF Electronic Files of Marked-Up Record Prints: Organize scanned PDF electronic copies of record Drawings into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include sheet identification within each file.
    - a. Media: Provide electronic files on DVD ROM media, in UDF version 1.02 disk format. Provided clearly labeled jewel cases.
  4. Identification: Provide the following designation on each sheet or file of the Record Drawings:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect and Construction Manager.
    - e. Name of Contractor.

## **2.02 RECORD SPECIFICATIONS**

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications and as follows:
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.



4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related addenda, Construction Change Directives, RFI's, ASI's, Change Orders and other contract modifications, and Record Drawings where applicable.

**B. Format:**

1. Paper: Bind paper copies in three-ring binders, each identified according to document type. Include record Specification directory organized by specification section number and title.
2. Electronic Media: Organize PDF files by types within directories and identify each file by name. Provide electronic files on DVD ROM media, in UDF version 1.02 disk format. Provided clearly labeled jewel cases.

**2.03 RECORD CONTRACT MODIFICATIONS**

- A. Preparation:** Assemble Addenda, Construction Change Directives, RFI's, ASI's and other contract modification documents relating to the physical work. Include all pertinent attachments, including associated Record Drawings and Record Specifications where applicable, and bind.
1. Record Drawings: Full-size drawings issued as part of contract modifications may be incorporated into the Record Drawing set, if cross-referencing is clearly provided between the contract modification document and the Record Drawing and between the Record Drawing and the issuing document.
  2. Record Specifications: Specifications issued as part of contract modifications may be incorporated into the Record Specification set, if cross-referencing is clearly provided between the contract modification document and the Record Specification and between the Record Specification and the issuing document.
- B. Mark Record Drawings and Record Specifications to indicate the appropriate contract modification of the physical work.**
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Provide a complete record of all products installed, and the details and locations of the installation. Include proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected, or cross reference to the modification document.
  3. Note related Addenda, Construction Change Directives, RFI's, ASI's, Change Orders and other contract modifications, on Record Drawings and Specifications where applicable.
- C. Format:**
1. Paper: Bind paper copies in three-ring binders, each identified according to document type. Include all attachments smaller than the size of the Drawings. Include a Record Contract Modification directory organized by number and title.
  2. Electronic Media: Organize PDF files by types within directories and identify each file by name. Provide electronic files on DVD ROM media, in UDF version 1.02 disk format. Provided clearly labeled jewel cases.

**PART 3 - EXECUTION**

**3.01 RECORDING AND MAINTENANCE**

- A. Recording:** Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as



they occur; do not wait until the end of Project.

- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for reference during normal working hours.

**END OF SECTION 017839.00**



**SECTION 02 4100  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Building demolition .
- B. Abandonment and removal of existing utilities and utility structures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- D. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

**PART 3 EXECUTION**

**2.01 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  - 3. Provide, erect, and maintain temporary barriers and security devices.
  - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 5. Do not close or obstruct roadways or sidewalks without permit.
  - 6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
  - 7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements that are not to be removed.
  - 1. Provide bracing and shoring.
  - 2. Prevent movement or settlement of adjacent structures.
  - 3. Stop work immediately if adjacent structures appear to be in danger.

**2.02 EXISTING UTILITIES**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.



- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

**2.03 EXISTING TREE REMOVAL**

- A. Existing trees identified for removal shall be completely demolished and removed from site.
- B. Existing plaque on tree adjacent to pool area shall be salvaged and relocated to another location on site per Owner's direction (location will be provided during course of construction).

**2.04 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**



**SECTION 03 2000  
CONCRETE REINFORCING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete.

**1.03 REFERENCE STANDARDS**

- A. ACI 318-14 - Building Code Requirements for Structural Concrete and Commentary.
- B. ACI 301 - Specifications for Structural Concrete.
- C. ACI SP-66 - ACI Detailing Manual.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- E. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
- F. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel.
- G. CRSI (DA4) - Manual of Standard Practice.
- H. CRSI (P1) - Placing Reinforcing Bars.

**1.04 SUBMITTALS**

- A. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

**PART 2 PRODUCTS**

**2.01 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

**2.02 RE-BAR SPLICING:**

- A. Coupler Systems: Mechanical devices for splicing reinforcing bars; capable of developing full steel reinforcing design strength in tension and compression.
- B. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for connecting dowels; capable of developing full steel reinforcing design strength in tension and compression.

**2.03 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

**PART 3 EXECUTION**

**3.01 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

**END OF SECTION**



**SECTION 03 3000  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete foundation walls.
- B. Joint devices associated with concrete work.
- C. Miscellaneous concrete elements, including equipment pads, equipment pits, thrust blocks, manholes and footings and pads.
- D. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 2000 - Concrete Reinforcing.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- C. ACI 301 - Specifications for Structural Concrete.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- F. ACI 305R - Guide to Hot Weather Concreting.
- G. ACI 306R - Guide to Cold Weather Concreting.
- H. ACI 308R - Guide to External Curing of Concrete.
- I. ACI 318 - Building Code requirements for Structural Concrete and Commentary; 2014.
- J. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- K. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- L. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
- M. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- N. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
- O. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- P. ASTM C150/C150M - Standard Specification for Portland Cement.
- Q. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
- R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
- S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- T. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete.
- U. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
- V. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.



- W. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- X. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
- Y. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
  - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
  - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 26 - Concrete Quality, Mixing and Placing.
- D. Test Reports: Submit report for each test or series of tests specified.
- E. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

#### **1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Moisture Emission Reducing Curing and Sealing Compound: Provide warranty to cost of flooring delamination failures for 10 years.
  - 1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

### **PART 2 PRODUCTS**

#### **2.01 REINFORCEMENT MATERIALS**

- A. Comply with requirements of Section 03 2000.

#### **2.02 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type V - Sulfate Resistant Portland type.
  - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
  - 1. Acquire aggregates for entire project from same source.
- C. Lightweight Aggregate: ASTM C330/C330M.
- D. Fly Ash: ASTM C618, Class C or F.
- E. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.



## 2.03 ADMIXTURES

- A. Chemical Admixture:
  - 1. Manufacturers:
    - a. Euclid.
    - b. Sika.
    - c. BASF Master Builders.
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Air Entrainment Admixture: ASTM C260/C260M.
- D. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- E. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- F. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- G. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- H. Accelerating Admixture: ASTM C494/C494M Type C.
- I. Retarding Admixture: ASTM C494/C494M Type B.
- J. Water Reducing Admixture: ASTM C494/C494M Type A.
- K. Shrinkage Reducing Admixture:
  - 1. ASTM C494/C494M, Type S.

## 2.04 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System:
  - 1. Complying with ASTM C881/C881M and of Type required for specific application.
- B. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
  - 1. Material: Closed-cell, non-absorbent, compressible polymer foam in sheet form.
  - 2. Manufacturers:
    - a. Nomaco, Inc; Nomaflex Expansion Joint Filler with Void Cap Option:  
[www.nomaco.com/#sle](http://www.nomaco.com/#sle).
    - b. W. R. Meadows, Inc; Deck-O-Foam Joint Filler with pre-scored top strip:  
[www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - c. Substitutions: See Section 01 6000 - Product Requirements.

## 2.05 CURING MATERIALS

- A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
  - 1. Manufacturers:
    - a. Dayton Superior Corporation: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company ; EUCOBAR: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. Kaufman Products Inc; VaporAid: [www.kaufmanproducts.net/#sle](http://www.kaufmanproducts.net/#sle).
    - d. SpecChem, LLC; SpecFilm Concentrate or SpecFilm:  
[www.specchemllc.com/#sle](http://www.specchemllc.com/#sle).



- e. W. R. Meadows, Inc; Evapre or Evapre-RTU: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
  - 1. Product dissipates within 4 to 6 weeks.
  - 2. Manufacturers:
    - a. Dayton Superior Corporation; Clear Cure VOC J7WB: [www.daytonsuperior.com/#sle](http://www.daytonsuperior.com/#sle).
    - b. Euclid Chemical Company; COLOR-CRETE CURE AND SEAL VOC: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. W. R. Meadows, Inc; 1100-Clear: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Curing and Sealing Compound, Moisture Emission Reducing, Membrane-Forming: Liquid, membrane-forming, clear sealer, for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission.
  - 1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.
  - 2. Comply with ASTM C309 and ASTM C1315 Type I Class A.
  - 3. VOC Content: Less than 100 g/L.
  - 4. Solids Content: 25 percent, minimum.
  - 5. Manufacturers:
    - a. Floor Seal Technology, Inc; VaporSeal 309 System: [www.floorseal.com/#sle](http://www.floorseal.com/#sle).
    - b. Sinak Corporation; VC5: [www.sinak.com/#sle](http://www.sinak.com/#sle).
    - c. Substitutions: See Section 01 6000 - Product Requirements.
- D. Moisture-Retaining Sheet: ASTM C171.
  - 1. Curing paper, regular.
  - 2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.
- E. Water: Potable, not detrimental to concrete.

## 2.06 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.
  - 2. Concrete Strength:  $f'_c = 3000$  psi at 28 days
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Normal Weight Concrete:
  - 1. As indicated on drawings.
  - 2. Maximum Aggregate Size: 5/8 inch.



## **2.07 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.02 PREPARATION**

- A. Verify that forms are clean and free of rust before applying release agent.
- B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
  - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

### **3.03 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Notify Architect not less than 24 hours prior to commencement of placement operations.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- D. Ensure reinforcement, inserts, waterstops, embedded parts and formed construction joint devices will not be disturbed during concrete placement.
- E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

### **3.04 CONCRETE FINISHING**

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
  - 1. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include ceramic tile with full bed setting system.
  - 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring and thin set ceramic tile.
  - 3. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to receive liquid hardeners, surfaces to be polished and all other exposed slab surfaces.



- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

### **3.05 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
  - 1. Normal concrete: Not less than seven days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

### **3.06 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified on the DSA-103 Testing and Inspection form as well as in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

### **3.07 DEFECTIVE CONCRETE**

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

### **3.08 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

### **END OF SECTION**



**SECTION 04 2000  
UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete Block.
- B. Mortar and Grout.
- C. Reinforcement and Anchorage.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- B. Section 03 3000 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.

**1.03 REFERENCE STANDARDS**

- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
- F. ASTM C91/C91M - Standard Specification for Masonry Cement.
- G. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
- I. ASTM C150/C150M - Standard Specification for Portland Cement.
- J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
- K. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
- L. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar.
- M. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
- N. ASTM C476 - Standard Specification for Grout for Masonry.
- O. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- P. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength.
- Q. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar.
- R. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
- S. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar and masonry accessories.



#### 1.05 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

### PART 2 PRODUCTS

#### 2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8" unless otherwise specified on construction documents..
  - 2. Load-Bearing Units: ASTM C90, normal weight.
    - a. Manufacturers:
      - 1) Basalite. Basis of Design
      - 2) Substitutions: See Section 01 6000 - Product Requirements.

#### 2.02 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type N.
- B. Portland Cement: ASTM C150/C150M, Type V
  - 1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.
- G. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
  - 1. Type: Type N.
  - 2. Color: Standard gray.
- H. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type O mortar in accordance with ASTM C270 with the addition of water only.
  - 1. Color: Standard gray.

#### 2.03 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; galvanized finish.
- B. Single Wythe Joint Reinforcement: Truss type; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

#### 2.04 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.



1. Masonry below grade and in contact with earth: Type S.
2. Exterior, loadbearing masonry: Type S.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

#### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

#### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

#### **3.04 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  1. Coursing: One unit and one mortar joint to equal 8 inches.

#### **3.05 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners, except for units laid in stack bond.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

#### **3.06 REINFORCEMENT AND ANCHORAGE - GENERAL**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.



### **3.07 TOLERANCES**

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation from Alignment of Columns: 1/4 inch.
- C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

### **3.08 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

### **3.09 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

### **3.10 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**



**SECTION 09 9620**  
**PERMANENT NON-SACRIFICIAL ANTI-GRAFFITI COATING**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Anti-graffiti coating systems vertical surfaces for cast-in-place site concrete.
- B. Surface preparation
- C. field application

**1.02 RELATED SECTIONS INCLUDE THE FOLLOWING:**

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 323300 - Architectural Site Concrete

**1.03 REGULATORY REQUIREMENTS**

- A. California Air Resources Board, Volatile Organic Compound (VOC) Limitation: Provide anti-graffiti coating materials, including primers, undercoats, and finish-coat materials, that have a VOC content of 100 g/l or less, consistent with Southern California Air Quality Management District (SCAQMD) Rule 1113 for architectural flat coatings.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating coating materials and mock-up location for Cast-in-place site walls.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include cleaning procedures and repair and patching techniques.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. Extra Coating Materials: 1 gallon of each type and color.
  - 2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

**1.05 QUALITY ASSURANCE**

- A. Maintain one copy of each referenced document that applies to application on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this section with minimum 8 years documented experience.

**1.06 MOCK-UP**

- A. Apply Sealer and Anti-graffiti coating to approved Architectural Site Concrete Mock-ups for review and approval by Architect and client prior to beginning work.
- B. Locate where directed.
- C. Mock-up may not remain as part of the Work.

**1.07 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within one year period after Date of Substantial Completion.



- C. Warranty: Include coverage for bond to substrate.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis-of-Design Products: The design for each non-sacrificial anti-graffiti coating system is based on the products indicated.
- B. Type 2, Silane/Siloxane-Based Systems:
1. Rainguard International Inc., VandlGuardTEN non-sacrificial Anti-Graffiti System.
    - a. Sealer; Product Micro-Seal Water Repellant.
    - b. Non-Sacrificial Coating; Product VandlGuardTEN
    - c. Finish Coat; Product VandlGuard Finish Coat.

### **2.02 PERFORMANCE REQUIREMENTS**

- A. General: Non-sacrificial anti-graffiti coating system with the following properties:
1. Superior protection against, and easy removal of, unwanted graffiti.
  2. Minimum alteration of appearance of treated surface when compared to untreated surface, including gloss and color.
  3. Minimum alteration of water vapor transmission rate through complete wall system.
    - a. Coating system shall have a minimum water vapor transmission rate of 95 percent when tested per ASTM D1653.
- B. Completed coating system performance shall comply with ASTM D 6578 "Standard Practice for Determination of Graffiti Resistance," and the following:
1. Cleanability Level 3: Achieve Level 3 cleaning performance, removing all test graffiti items using citrus-based cleaners or milder solvents.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions under which anti-graffiti coatings will be applied, for compliance with coating application requirements.
- B. Apply coatings only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry.

### **3.02 PREPARATION**

- A. General: Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item; provide surface-applied protection before surface preparation and coating.
1. After completing coating operations, reinstall items that were removed, using workers skilled in the trades involved.
- B. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.
1. Prepare concrete to be coated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.
  2. Surfaces to receive sealer shall be cleaned of dirt, oil, graffiti, grease, laitance, and other contaminants.
  3. Mid-pressure water (1500 psi) washing is the minimum cleaning that will be accepted, other methods, such as abrasive blasting and power may be submitted for review.



4. Schedule cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
- C. Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.
  1. Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.
  2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application.
  3. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
  4. Use only the type of thinners approved by manufacturer and only within recommended limits.
- D. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of coating system components. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of components being deposited on surfaces. Cover live plants and grass.
- E. Coordination with Sealants: Do not apply anti-graffiti coatings until sealants for joints adjacent to surfaces receiving coatings have been installed and cured.
  1. Anti-graffiti coating work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, anti-graffiti coatings, and sealant materials identical to those used in the work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.03 APPLICATION

- A. General: Apply anti-graffiti coatings according to manufacturer's written instructions.
  1. Use applicators and techniques best suited for the material being applied.
  2. Do not apply anti-graffiti coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
  3. Coating surface treatments and finishes are indicated in the coating system descriptions.
  4. Provide finish coats compatible with primers used.
  5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, drinking fountains, grilles, covers for electrical equipment, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
- B. Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces.
  1. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
- C. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.
- D. The number of coats and film thickness required is the same regardless of application method.
  1. Micro-Seal- one (1) coat
  2. VandIGuard TEN- two (2) coats



3. VandlGuard Finish Coat- one (1) coat

- E. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. Allow sufficient time between successive coats to permit proper drying.
- F. Give special attention to edges, corners, crevices, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.
- G. Application Procedures: Apply coatings according to manufacturer's written instructions.
  - 1. Spray Equipment: Use spray equipment with pressure and orifice size recommended by manufacturer for material and texture required.
- H. Minimum Coating Thickness: Apply each material no thinner than manufacturers recommended spreading rate.
  - 1. Provide total dry film thickness of the entire system as recommended by manufacturer.
- I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by manufacturer, to material required to be coated or finished that has not been prime coated by others.
- J. Recoat primed and sealed substrates immediately if there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.
- K. Completed Work: Match accepted mockups for shade and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

**3.04 FIELD QUALITY CONTROL**

- A. Provide the services of the manufacturer's authorized field representative to verify that installed products comply with manufacturer's requirements and with the standard established by the Architect approved mockup/test panels.
- B. Remove and replace work where test results indicate that it does not comply with specified requirements.

**3.05 CLEANING**

- A. Immediately clean anti-graffiti coatings from adjoining surfaces and surfaces soiled or damaged by application as work progresses. Repair damage caused by application. Comply with manufacturer's written cleaning instructions.
- B. Clean up debris and unused material and remove from site.

**3.06 PROTECTION**

- A. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

**END OF SECTION**



**SECTION 11 6833  
ATHLETIC FIELD EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Outdoor basketball equipment.

**1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide athletic field equipment manufacturer's product data indicating materials of construction, compliance with specified standards, installation procedures, and necessary safety limitations.
- C. Shop Drawings: Submit detailed scale drawings showing athletic field equipment and perimeter layout.
  - 1. Indicate locations and dimensions of footings and anchorage points.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store equipment on project site in accordance with manufacturer's recommendations.
- B. Store materials in a dry, covered area, and elevated above grade.

**1.04 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum 1 year manufacturer warranty for basketball athletic equipment.

**PART 2 PRODUCTS**

**2.01 ATHLETIC FIELD EQUIPMENT - GENERAL**

**2.02 OUTDOOR BASKETBALL EQUIPMENT**

- A. Manufacturers:
  - 1. Porter Athletic Co, [www.litaniasportsgroup.com](http://www.litaniasportsgroup.com).
  - 2. Draper, Inc., [www.draperinc.com](http://www.draperinc.com).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

**2.03 MATERIALS**

- A. Steel Pipe and Tube: Complying with ASTM A135/A135M, ASTM A500/A500M, or ASTM A513/A513M; hot-dip galvanized and free of excess weld and spatter.
  - 1. Tensile Strength: 45,000 psi, minimum.
  - 2. Yield Point: 33,000 psi, minimum.
  - 3. Galvanizing: Hot-dip metal components in zinc after fabrication, in accordance with ASTM A123/A123M; remove tailings and sharp protrusions and burnish edges.
- B. Extruded Aluminum: ASTM B221 or ASTM B221M, Alloy 6061, 6062, or 6063.
  - 1. Tensile Strength: 39,000 psi, minimum.
  - 2. Yield Point: 36,500 psi, minimum.
- C. Cast Aluminum: ASTM B26/B26M, ASTM B108/B108M, or ASTM B179.



- D. Hardware: Provide design without hazardous protrusions, corners, or finishes, and requiring tools for removal after installation; countersunk fasteners are preferred.
  - 1. Use stainless steel for metal-to-metal connections; select type to minimize galvanic corrosion of materials connected by hardware.
  - 2. Use stainless steel for wood-to-wood and wood-to-metal connections.
  - 3. Use stainless steel with plastic components.
  - 4. Bearings: Self lubricating.
  - 5. Hooks, Including S-Hooks: Closed loop; maximum gap 0.04 inches.
  - 6. Rails and Loops: Same metal as item is mounted on, or aluminum; with powder coating.
  - 7. Anchors: In accordance with manufacturer's recommendations.
- E. Powder Coating for Steel: Electrostatically applied and oven cured polyester powder over electrostatic zinc coating.

### **PART 3 EXECUTION**

#### **3.01 VERIFICATION OF CONDITIONS**

- A. Verify that athletic field equipment area has been graded to subgrade elevations required and that excess soil, rocks, and debris has been removed as necessary for installation of footings.
- B. Verify that athletic field equipment footings have been installed in proper locations and at proper elevations.
- C. Verify location of underground utilities and facilities in athletic field equipment area; damage to underground utilities and facilities will be repaired at Contractor's expense.

#### **3.02 PREPARATION**

- A. Stake location of athletic field equipment elements, including necessary athletic field perimeters, surfacing, access and egress points, hard surfaces, walls, fences, and/or structures.
- B. Stake layout of athletic field equipment perimeter in accordance with approved shop drawings before starting any work.
  - 1. Verify that athletic field perimeters do not overlap hard surfaces, whether currently installed or not.
  - 2. Verify that athletic fields are free of obstructions.
  - 3. If conflicts or obstructions are found, notify Architect.
  - 4. Do not proceed with this work until revised drawings have been provided, showing corrected layout, and that any obstructions have been removed or corrections to layout have been made.

#### **3.03 INSTALLATION**

- A. Install athletic field equipment in accordance with manufacturer's instructions, and rules and regulations of specified athletic association indicated for this work.
- B. Install athletic field equipment without sharp points, edges, or protrusions; entanglement hazards or pinch, crush, or shear points.

#### **3.04 CLEANING**

- A. Clean athletic field equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation; clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.



- B. Clean athletic field area of excess construction materials, debris, and waste.
- C. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction.

**END OF SECTION**



**SECTION 26 0519**  
**LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Underground feeder and branch-circuit cable.
- B. Wiring connectors.
- C. Electrical tape.
- D. Wire pulling lubricant.
- E. Cable ties.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- B. Section 31 2316 - Excavation.
- C. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- D. Section 31 2323 - Fill: Bedding and backfilling.

**1.03 REFERENCE STANDARDS**

- A. CEC - California
- B. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire.
- C. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
- D. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes.
- E. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation.
- F. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- H. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF).
- I. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.
- J. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems.
- K. UL 44 - Thermoset-Insulated Wires and Cables.
- L. UL 83 - Thermoplastic-Insulated Wires and Cables.
- M. UL 486A-486B - Wire Connectors.
- N. UL 486C - Splicing Wire Connectors.
- O. UL 486D - Sealed Wire Connector Systems.
- P. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables.
- Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.

**1.04 ADMINISTRATIVE REQUIREMENTS**



A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate the installation of direct burial cable with other trades to avoid conflicts with piping or other potential conflicts.
3. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- C. Field Quality Control Test Reports.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

**1.06 QUALITY ASSURANCE**

- A. Conform to requirements of CEC.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

**PART 2 PRODUCTS**

**2.01 CONDUCTOR AND CABLE APPLICATIONS**

- A. Do not use conductors and cables for applications other than as permitted by CEC and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.

**2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS**

- A. Provide products that comply with requirements of CEC.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.



- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 26 0526.
- H. Conductor Material:
  - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
  - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
  - 3. Tinned Copper Conductors: Comply with ASTM B33.
- I. Minimum Conductor Size:
  - 1. Branch Circuits: 12 AWG.
    - a. Exceptions:
      - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
      - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
- J. Where conductor size is not indicated, size to comply with CEC but not less than applicable minimum size requirements specified.
- K. Conductor Color Coding:
  - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
  - 2. Color Coding Method: Integrally colored insulation.
  - 3. Color Code:
    - a. 208Y/120 V, 3 Phase, 4 Wire System:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
      - 4) Neutral/Grounded: White.
    - b. Equipment Ground, All Systems: Green.

## **2.03 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE**

- A. Manufacturers:
  - 1. Southwire Company: [www.southwire.com/#sle](http://www.southwire.com/#sle).
  - 2. America Insulated Wire Corp.
- B. Description: CEC, Type UF multiple-conductor cable listed and labeled as complying with UL 493, Type UF-B.
- C. Provide equipment grounding conductor unless otherwise indicated.
- D. Conductor Stranding:
  - 1. Size 10 AWG and Smaller: Solid.
  - 2. Size 8 AWG and Larger: Stranded.
- E. Insulation Voltage Rating: 600 V.

## **2.04 WIRING CONNECTORS**



- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Wiring Connectors for Splices and Taps:
  - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
  - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- C. Wiring Connectors for Terminations:
  - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
  - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
  - 3. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
- D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- E. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- F. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
  - 1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
- G. Mechanical Connectors: Provide bolted type or set-screw type.
- H. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

## 2.05 WIRING ACCESSORIES

- A. Electrical Tape:
  - 1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
  - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
  - 3. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
  - 1. Manufacturers:
    - a. 3M: [www.3m.com/#sle](http://www.3m.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.



- C. Cable Ties: Material and tensile strength rating suitable for application.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with CEC.
- D. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 PREPARATION**

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

#### **3.03 INSTALLATION**

- A. Circuiting Requirements:
  - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
  - 2. When circuit destination is indicated and routing is not shown, determine exact routing required.
  - 3. Arrange circuiting to minimize splices.
  - 4. Include circuit lengths required to install connected devices within 10 ft of location shown.
  - 5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with CEC.
  - 6. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is not permitted.
- B. Install products in accordance with manufacturer's instructions.
- C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.
- D. Install underground feeder and branch-circuit cable (Type UF-B) in accordance with NECA 121.
- E. Installation in Raceway:
  - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  - 2. Pull all conductors and cables together into raceway at same time.
  - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- G. Secure and support conductors and cables in accordance with CEC using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- H. Terminate cables using suitable fittings.



- I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
  - J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with CEC.
  - K. Make wiring connections using specified wiring connectors.
    - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
    - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
    - 3. Do not remove conductor strands to facilitate insertion into connector.
    - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.
    - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
    - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
  - L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
    - 1. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape or heat shrink tubing.
      - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
      - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
    - 2. Wet Locations: Use heat shrink tubing.
  - M. Insulate ends of spare conductors using vinyl insulating electrical tape.
  - N. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.
- 3.04 FIELD QUALITY CONTROL**
- A. See Section 01 4000 - Quality Requirements, for additional requirements.
  - B. Perform inspection, testing and adjusting in accordance with Section 01 4000.
  - C. Inspect and test in accordance with NETA ATS, except Section 4.
  - D. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
  - E. Correct deficiencies and replace damaged or defective conductors and cables.

**END OF SECTION**



**SECTION 26 0526**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
  - 1. Includes oxide inhibiting compound.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 26 5600 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.

**1.03 REFERENCE STANDARDS**

- A. CEC - California
- B. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems.
- E. UL 467 - Grounding and Bonding Equipment.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. See Section 01 3300 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

**1.06 QUALITY ASSURANCE**

- A. Conform to requirements of CEC.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

**PART 2 PRODUCTS**

**2.01 GROUNDING AND BONDING REQUIREMENTS**

- A. Do not use products for applications other than as permitted by CEC and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.



- C. Where conductor size is not indicated, size to comply with CEC but not less than applicable minimum size requirements specified.
- D. Grounding System Resistance:
  - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
  - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
  - 3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.
- E. Grounding for Separate Building or Structure Supplied by Feeder(s) or Branch Circuits:
  - 1. Provide grounding electrode system for each separate building or structure.
  - 2. Provide equipment grounding conductor routed with supply conductors.
  - 3. For each disconnecting means, provide grounding electrode conductor to connect equipment ground bus to grounding electrode system.
  - 4. Do not make any connections and remove any factory-installed jumpers between neutral (grounded) conductors and ground.
- F. Bonding and Equipment Grounding:
  - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with CEC.
  - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
  - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with CEC.
  - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
  - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
  - 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
- G. Communications Systems Grounding and Bonding:
  - 1. Provide intersystem bonding termination at service equipment or metering equipment enclosure and at disconnecting means for any additional buildings or structures in accordance with CEC.
  - 2. Provide bonding jumper in raceway from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.
    - a. Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.
    - b. Raceway Size: 3/4 inch trade size unless otherwise indicated or required.
    - c. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.



H. Pole-Mounted Luminaires: Also comply with Section 26 5600.

## **2.02 GROUNDING AND BONDING COMPONENTS**

### **A. General Requirements:**

1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

### **B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:**

1. Use insulated copper conductors unless otherwise indicated.
  - a. Exceptions:
    - 1) Use bare copper conductors where installed underground in direct contact with earth.
    - 2) Use bare copper conductors where directly encased in concrete (not in raceway).

### **C. Connectors for Grounding and Bonding:**

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors or exothermic welded connections for accessible connections.

### **D. Ground Bushing:**

1. Manufacturers:
  - a. O-Z/Gedney
  - b. Substitutions: See Section 01 6000 - Product Requirements.

### **E. Oxide Inhibiting Compound: Comply with Section 26 0519.**

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- C. Make grounding and bonding connections using specified connectors.
  1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.



4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 26 0553.

**3.03 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Perform inspection, testing and adjusting in accordance with Section 01 4000.
- C. Inspect and test in accordance with NETA ATS except Section 4.
- D. Perform inspections and tests listed in NETA ATS, Section 7.13.
- E. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- F. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

**END OF SECTION**



**SECTION 26 0529  
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 26 0533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- C. Section 26 0533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

**1.03 REFERENCE STANDARDS**

- A. CEC - California
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
  - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
  - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
  - 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 3000.

**1.05 SUBMITTALS**

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports and post-installed concrete and masonry anchors.

**1.06 QUALITY ASSURANCE**

- A. Comply with CEC.



- B. Comply with applicable building code.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

**PART 2 PRODUCTS**

**2.01 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 3:1. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do not use products for applications other than as permitted by CEC and product listing.
5. Do not use wire, chain, perforated pipe strap or wood for permanent supports unless specifically indicated or permitted.
6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
  - a. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel or approved equivalent unless otherwise indicated.
  - b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
  - c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
2. Conduit Clamps: Bolted type unless otherwise indicated.
3. Manufacturers:
  - a. Cooper Crouse-Hinds, a division of Eaton Corporation:  
[www.cooperindustries.com/#sle](http://www.cooperindustries.com/#sle).
  - b. O-Z/Gedney, a brand of Emerson Industrial Automation:  
[www.emersonindustrial.com/#sle](http://www.emersonindustrial.com/#sle).
  - c. Substitutions: See Section 01 6000 - Product Requirements.

- C. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
2. Concrete: Use expansion anchors or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
4. Hollow Masonry: Use toggle bolts.
5. Hollow Stud Walls: Use toggle bolts.



6. Steel: Use beam clamps, machine bolts or welded threaded studs.
7. Sheet Metal: Use sheet metal screws.
8. Plastic and lead anchors are not permitted.
9. Powder-actuated fasteners are not permitted.
10. Hammer-driven anchors and fasteners are not permitted.
11. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.
12. Manufacturers - Mechanical Anchors:
  - a. Hilti, Inc: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
  - b. Substitutions: See Section 01 6000 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that mounting surfaces are ready to receive support and attachment components.
- B. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- H. Equipment Support and Attachment:
  1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- I. Conduit Support and Attachment: Also comply with Section 26 0533.13.
- J. Box Support and Attachment: Also comply with Section 26 0533.16.
- K. Secure fasteners according to manufacturer's recommended torque settings.
- L. Remove temporary supports.



- M. Identify independent electrical component support wires above accessible ceilings (only where specifically indicated or permitted) with color distinguishable from ceiling support wires in accordance with CEC.

**3.03 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

**END OF SECTION**



**SECTION 26 0533.13  
CONDUIT FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Intermediate metal conduit (IMC).
- B. Electrical metallic tubing (EMT).
- C. Rigid polyvinyl chloride (PVC) conduit.
- D. Conduit fittings.
- E. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete encasement of conduits.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
  - 1. Includes additional requirements for fittings for grounding and bonding.
- C. Section 26 0529 - Hangers and Supports for Electrical Systems.
- D. Section 26 0533.16 - Boxes for Electrical Systems.
- E. Section 26 2100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.
- F. Section 27 1000 - Structured Cabling: Additional requirements for communications systems conduits.
- G. Section 31 2316 - Excavation.
- H. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- I. Section 31 2323 - Fill: Bedding and backfilling.

**1.03 REFERENCE STANDARDS**

- A. CEC - California
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S).
- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC).
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT).
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC).
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable.
- H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit.
- I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.
- J. UL 514B - Conduit, Tubing, and Cable Fittings.
- K. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.
- L. UL 797 - Electrical Metallic Tubing-Steel.
- M. UL 1242 - Electrical Intermediate Metal Conduit-Steel.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:



1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

**B. Sequencing:**

1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

**1.05 SUBMITTALS**

- A. See Section 01 3300 - Submittal Procedures for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

**1.06 QUALITY ASSURANCE**

- A. Conform to requirements of CEC.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

**PART 2 PRODUCTS**

**2.01 CONDUIT APPLICATIONS**

- A. Do not use conduit and associated fittings for applications other than as permitted by CEC and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use EMT..
- C. Underground:
  1. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit, intermediate metallic conduit (IMC), PVC-coated galvanized steel rigid metal conduit or rigid PVC conduit.
  2. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
  3. Where steel conduit emerges from concrete into soil, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches on either side of where conduit emerges or use PVC-coated galvanized steel rigid metal conduit.
- D. Embedded Within Concrete:
  1. Within Slab on Grade: Not permitted.
- E. Exposed, Exterior: Use intermediate metal conduit (IMC).
- F. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).



## **2.02 CONDUIT REQUIREMENTS**

- A. Electrical Service Conduits: Also comply with Section 26 2100.
- B. Communications Systems Conduits: Also comply with Section 27 1000.
- C. Fittings for Grounding and Bonding: Also comply with Section 26 0526.
- D. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- E. Provide products listed, classified, and labeled as suitable for the purpose intended.
- F. Minimum Conduit Size, Unless Otherwise Indicated:
  - 1. Branch Circuits: 1/2 inch (16 mm) trade size.
  - 2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
  - 3. Underground, Interior: 3/4 inch (21 mm) trade size.
  - 4. Underground, Exterior: 1 inch (27 mm) trade size.
- G. Where conduit size is not indicated, size to comply with CEC but not less than applicable minimum size requirements specified.

## **2.03 INTERMEDIATE METAL CONDUIT (IMC)**

- A. Manufacturers:
  - 1. Allied Tube & Conduit: [www.alliedeg.com/#sle](http://www.alliedeg.com/#sle).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- C. Fittings:
  - 1. Manufacturers:
    - a. Appleton Electric Co..
    - b. Substitutions: See Section 01 6000 - Product Requirements.
  - 2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 3. Material: Use steel or malleable iron.
  - 4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

## **2.04 ELECTRICAL METALLIC TUBING (EMT)**

- A. Manufacturers:
  - 1. Allied Tube & Conduit: [www.alliedeg.com/#sle](http://www.alliedeg.com/#sle).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description: CEC, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
  - 1. Manufacturers:
    - a. Appleton Electric Co..
    - b. Substitutions: See Section 01 6000 - Product Requirements.
  - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.



3. Material: Use steel or malleable iron.
4. Connectors and Couplings: Use compression (gland) or set-screw type.
  - a. Do not use indenter type connectors and couplings.

## **2.05 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT**

- A. Manufacturers:
  1. Allied Tube and Conduit Co..
  2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description: CEC, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
  1. Manufacturer: Same as manufacturer of conduit to be connected.
  2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

## **2.06 ACCESSORIES**

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- D. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that mounting surfaces are ready to receive conduits.
- B. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
- C. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- D. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- E. Conduit Routing:
  1. Unless dimensioned, conduit routing indicated is diagrammatic.
  2. When conduit destination is indicated and routing is not shown, determine exact routing required.
  3. Conceal all conduits unless specifically indicated to be exposed.
  4. Conduits in the following areas may be exposed, unless otherwise indicated:
    - a. Electrical rooms.
    - b. Mechanical equipment rooms.
  5. Unless otherwise approved, do not route conduits exposed:



- a. Across floors.
  - b. Across roofs.
  - c. Across top of parapet walls.
  - d. Across building exterior surfaces.
6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
  7. Arrange conduit to maintain adequate headroom, clearances, and access.
  8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
  9. Arrange conduit to provide no more than 150 feet between pull points.
  10. Route conduits above water and drain piping where possible.
  11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
  12. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
  13. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
    - a. Heaters.
    - b. Hot water piping.
    - c. Flues.
  14. Group parallel conduits in the same area together on a common rack.

**F. Conduit Support:**

1. Secure and support conduits in accordance with CEC and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use conduit strap to support single surface-mounted conduit.
  - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use of wire for support of conduits is not permitted.
9. Where conduit support intervals specified in CEC and NECA standards differ, comply with the most stringent requirements.

**G. Connections and Terminations:**



1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

**H. Penetrations:**

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

**I. Underground Installation:**

1. Provide trenching and backfilling in accordance with Section 31 2316.13.
2. Minimum Cover, Unless Otherwise Indicated or Required:
  - a. Underground, Exterior: 24 inches.

**J. Concrete Encasement:** Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 03 3000 with minimum concrete cover of 3 inches on all sides unless otherwise indicated.

**K. Conduit Movement Provisions:** Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where conduits are subject to earth movement by settlement or frost.

**L. Condensation Prevention:** Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not



limited to:

1. Where conduits pass from outdoors into conditioned interior spaces.
  2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- M. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- N. Provide grounding and bonding in accordance with Section 26 0526.

### **3.03 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective conduits.

### **3.04 CLEANING**

- A. Clean interior of conduits to remove moisture and foreign matter.

### **3.05 PROTECTION**

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

**END OF SECTION**



**SECTION 26 0533.16**  
**BOXES FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Underground boxes/enclosures.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 08 3100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- C. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- D. Section 26 0529 - Hangers and Supports for Electrical Systems.
- E. Section 26 0533.13 - Conduit for Electrical Systems:
  - 1. Conduit bodies and other fittings.
- F. Section 33 7119 - Electrical Underground Ducts, Ductbanks, and Manholes: Concrete manholes for electrical systems.

**1.03 REFERENCE STANDARDS**

- A. CEC - California
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- C. NECA 130 - Standard for Installing and Maintaining Wiring Devices.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- E. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations.
- F. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations.
- G. UL 508A - UL Standard for Safety Industrial Control Panels .

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by CEC.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to CEC.
  - 4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to CEC.
  - 5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
  - 6. Coordinate the work with other trades to preserve insulation integrity.
  - 7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.



8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

#### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes and underground boxes/enclosures.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes and underground boxes/enclosures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 6000 - Product Requirements, for additional provisions.
  2. Keys for Lockable Enclosures: Two of each different key.

#### **1.06 QUALITY ASSURANCE**

- A. Conform to requirements of CEC.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 BOXES**

- A. General Requirements:
  1. Do not use boxes and associated accessories for applications other than as permitted by CEC and product listing.
  2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
  3. Provide products listed, classified, and labeled as suitable for the purpose intended.
  4. Where box size is not indicated, size to comply with CEC but not less than applicable minimum size requirements specified.
  5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
  1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
  2. NEMA 250 Environment Type, Unless Otherwise Indicated:
    - a. Outdoor Locations: Type 3R, painted steel.
  3. Junction and Pull Boxes Larger Than 100 cubic inches:



- a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
- C. Underground Boxes/Enclosures:
  1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
  2. Size: As indicated on drawings.
  3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
  4. Applications:
    - a. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and CEC.
- D. Box Locations:
  1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 3100 as required.
  2. Unless dimensioned, box locations indicated are approximate.
  3. Locate boxes as required for devices installed under other sections or by others.
  4. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
- E. Box Supports:
  1. Secure and support boxes in accordance with CEC and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
  2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with CEC. Do not provide support from piping, ductwork, or other systems.
- F. Install boxes plumb and level.
- G. Install boxes as required to preserve insulation integrity.
- H. Underground Boxes/Enclosures:
  1. Install enclosure on gravel base, minimum 6 inches deep.
  2. Flush-mount enclosures located in concrete or paved areas.
  3. Mount enclosures located in landscaped areas with top at 1 inch above finished grade.



- 4. Provide cast-in-place concrete collar constructed in accordance with Section 03 3000, minimum 10 inches wide by 12 inches deep, around enclosures that are not located in concrete areas.
- 5. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.
- I. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- J. Close unused box openings.
- K. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- L. Provide grounding and bonding in accordance with Section 26 0526.

### **3.03 CLEANING**

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

### **3.04 PROTECTION**

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

**END OF SECTION**



**SECTION 26 0553  
IDENTIFICATION FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Identification nameplates and labels.
- B. Wire and cable markers.
- C. Underground warning tape.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

**1.03 REFERENCE STANDARDS**

- A. CEC - California

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
  - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
  - 2. Do not install identification products until final surface finishes and painting are complete.

**1.05 SUBMITTALS**

- A. See Section 01 3300 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

**1.06 QUALITY ASSURANCE**

- A. Conform to requirements of CEC.

**1.07 FIELD CONDITIONS**

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

**PART 2 PRODUCTS**

**2.01 IDENTIFICATION REQUIREMENTS**

- A. Identification for Conductors and Cables:
  - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
  - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
  - 3. Manufacturers:



- a. Thomas and Betts Corp.
  - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Identification for Raceways:
  - 1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet.
- C. Identification for Boxes:
  - 1. Use voltage markers to identify highest voltage present.
- D. Identification for Devices:
  - 1. Identification for Communications Devices: Comply with Section 27 1000.
  - 2. Wiring Device and Wallplate Finishes: Comply with Section 26 2726.
  - 3. Use identification label or engraved wallplate to identify serving branch circuit.

## **2.02 IDENTIFICATION NAMEPLATES AND LABELS**

- A. Identification Nameplates:
  - 1. Materials:
    - a. Outdoor Locations: Use stainless steel or aluminum nameplates suitable for exterior use.
  - 2. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
  - 3. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
  - 4. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
  - 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
    - a. Use only for indoor locations.
  - 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
  - 1. Minimum Size: 1 inch by 2.5 inches.
  - 2. Legend:
    - a. Equipment designation or other approved description.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height:
    - a. Equipment Designation: 1/2 inch.
  - 5. Color:
    - a. Normal Power System: White text on black background.

## **2.03 WIRE AND CABLE MARKERS**

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on or vinyl split sleeve type markers suitable for the conductor or cable to be identified.



- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch.
- F. Color: Black text on white background unless otherwise indicated.

#### **2.04 VOLTAGE MARKERS**

- A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth or vinyl snap-around type markers.
- B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
- C. Minimum Size:
  - 1. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
  - 2. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
  - 3. Markers for Junction Boxes: 1/2 by 2 1/4 inches.
- D. Legend:
  - 1. Markers for Voltage Identification: Highest voltage present.
- E. Color: Black text on orange background unless otherwise indicated.

#### **2.05 UNDERGROUND WARNING TAPE**

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- B. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.
- C. Foil-backed Detectable Type Tape: 3 inches wide, with minimum thickness of 5 mil, unless otherwise required for proper detection.
- D. Legend: Type of service, continuously repeated over full length of tape.
- E. Color:

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
  - 1. Surface-Mounted Equipment: Enclosure front.
  - 2. Flush-Mounted Equipment: Inside of equipment door.
  - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
  - 4. Elevated Equipment: Legible from the floor or working platform.
  - 5. Conduits: Legible from the floor.



- 6. Boxes: Outside face of cover.
  - 7. Conductors and Cables: Legible from the point of access.
  - 8. Devices: Outside face of cover.
  - C. Install identification products centered, level, and parallel with lines of item being identified.
  - D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
  - E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
  - F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.
- 3.03 FIELD QUALITY CONTROL**
- A. See Section 01 4000 - Quality Requirements, for additional requirements.
  - B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

**END OF SECTION**



**SECTION 26 0583  
WIRING CONNECTIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical connections to equipment.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 26 0533.16 - Boxes for Electrical Systems.

**1.03 REFERENCE STANDARDS**

- A. CEC - California
- B. NEMA WD 1 - General Color Requirements for Wiring Devices.
- C. NEMA WD 6 - Wiring Devices - Dimensional Specifications.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
  - 2. Determine connection locations and requirements.
- B. Sequencing:
  - 1. Install rough-in of electrical connections before installation of equipment is required.
  - 2. Make electrical connections before required start-up of equipment.

**1.05 SUBMITTALS**

- A. See Section 01 3300 - Submittal Procedures, for submittal procedures.
- B. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.

**1.06 QUALITY ASSURANCE**

- A. Conform to requirements of CEC.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
  - 1. Colors: Conform to NEMA WD 1.
  - 2. Cord Construction: CEC, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
  - 3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
- B. Disconnect Switches: As specified in Section 26 2816.16 and in individual equipment sections.
- C. Wire and Cable: As specified in Section 26 0519.
- D. Boxes: As specified in Section 26 0533.16.

**PART 3 EXECUTION**



**3.01 EXAMINATION**

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

**3.02 ELECTRICAL CONNECTIONS**

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- C. Provide cord and cap where field-supplied attachment plug is required.
- D. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- E. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- F. Install terminal block jumpers to complete equipment wiring requirements.
- G. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

**END OF SECTION**



**SECTION 31 1000  
SITE CLEARING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- B. Section 01 5713 - Temporary Erosion and Sediment Control.
- C. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- D. Section 02 4100 - Demolition: Removal of built elements and utilities.
- E. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Fill Material: As specified in Section 31 2323 - Fill and Backfill

**PART 3 EXECUTION**

**3.01 SITE CLEARING**

- A. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

**3.02 EXISTING UTILITIES AND BUILT ELEMENTS**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.

**3.03 VEGETATION**

- A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.
- B. Do not begin clearing until vegetation to be relocated has been removed.
- C. Preservation of existing vegetation: The construction schedule shall consider the amount and duration of soil exposed to erosion by wind, rainfall, and vehicle tracking and seek to minimize disturbed soil during the rainy season. A schedule shall be prepared that shows the sequencing of construction activities with installation of maintenance of soil stabilization and sediment control BMPs.
- D. Do not remove or damage vegetation beyond the limits indicated on drawings.
  - 1. Exception: Specific trees and vegetation indicated on drawings to be removed.
  - 2. Exception: Selective thinning of undergrowth specified elsewhere.
- E. Install substantial, highly visible fences at least 4 feet high to prevent inadvertent damage to vegetation to remain:



1. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.
  2. Around other vegetation to remain within vegetation removal limits.
  3. See Section 01 5000 for fence construction requirements.
- F. Around other vegetation to remain within vegetation removal limits.
- G. See Section 01 5000 for fence construction requirements.
- H. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
- I. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
  2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 36 inches. Remove roots 2" in diameter and larger.
  3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 36 inches. Remove roots 2" in diameter and larger.
  4. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- J. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.
- K. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.
- 3.04 DEBRIS**
- A. Remove debris, junk, and trash from site.
  - B. Leave site in clean condition, ready for subsequent work.
  - C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**



**SECTION 31 2200  
GRADING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Removal of topsoil.
- B. Rough grading the site for site structures building pads and paved areas.
- C. Finish grading for planting.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 1000 - Site Clearing.
- B. Section 31 2316 - Excavation.
- C. Section 31 2316.13 - Trenching: Trenching and backfilling for utilities.
- D. Section 31 2323 - Fill: Filling and compaction.
- E. Geological Hazards and Geotechnical Engineering Report, Valley Robotics Academy, Lodi, California, December 19, 2019, by Terracon Consultants Inc., Project No. NA 195099.

**1.03 SUBMITTALS**

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

**1.04 QUALITY ASSURANCE**

- A. Perform work in accordance with the Standards Specifications for Public Works Construction (Greenbook); latest edition.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Topsoil: See Section 31 2323.
- B. Other Fill Materials: See Section 31 2323.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey monuments and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Protect from damage above- and below-grade utilities to remain.
- D. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- E. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving and curbs, from damage by grading equipment and vehicular traffic.
- F. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- G. Protect plants, lawns, rock outcroppings and other features to remain as a portion of final landscaping.



### 3.03 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
  - 1. Remove sod, grass, and any other vegetation before stripping top soil.
  - 2. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
  - 3. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.
  - 4. Strip topsoil to depth indicated on drawings.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. See Section 31 2323 for filling procedures.
- G. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.
- H. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- I. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

### 3.04 SOIL REMOVAL

- A. Stockpile topsoil to be re-used on site; remove remainder from site.
  - 1. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water and other erosion control measures.
    - a. Limit height of topsoil stockpiles to 72 inches.
    - b. Do not stockpile topsoil within plant protection zones.
    - c. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
- B. Stockpile subsoil to be re-used on site; remove remainder from site.

### 3.05 FINISH GRADING

- A. Before Finish Grading:
  - 1. Verify building and trench backfilling have been inspected.
  - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 2 inch in size. Remove soil contaminated with petroleum products.
- C. Scarify in accordance with the Geotechnical Report and as indicated on the plans.
- D. Place topsoil in areas indicated.
- E. Place topsoil during dry weather.
- F. Remove roots, weeds, rocks, and foreign material while spreading.
- G. Near plants spread topsoil manually to prevent damage.



- H. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- I. Lightly compact placed topsoil.
- J. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

**3.06 TOLERANCES**

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

**3.07 REPAIR AND RESTORATION**

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from a certified Arborist as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

**3.08 FIELD QUALITY CONTROL**

- A. See Section 31 2323 for compaction density testing.

**3.09 CLEANING**

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

**END OF SECTION**



**SECTION 31 2316  
EXCAVATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating for building volume below grade, footings, pile caps, slabs-on-grade, paving, site structures and utilities within the building.
- B. Trenching for utilities outside the building .

**1.02 RELATED REQUIREMENTS**

- A. Section 01 5713 - Temporary Erosion and Sedimentation Control: Slope protection and erosion control.
- B. Section 31 2200 - Grading
- C. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.
- D. Section 31 2323 - Fill
- E. Geological Hazards and Geotechnical Engineering Report, Valley Robotics Academy, Lodi, California, December 19, 2019, by Terracon Consultants Inc., Project No. NA 195099.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. See Geotechnical Report.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey monuments and intended elevations for the work are as indicated.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.
- D. Protect plants, lawns, rock outcroppings and other features to remain.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

**3.03 EXCAVATING**

- A. Excavate to accommodate new structures and construction operations.
- B. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Notify the Geotechnical Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- F. If excavated material is to be re-used as fill, stockpiling of soil must be in an area designated for stockpiling on site in accordance with Section 31 2200.

**3.04 FIELD QUALITY CONTROL**



- A. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

**3.05 PROTECTION**

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

**END OF SECTION**



**SECTION 31 2316.13  
TRENCHING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating, backfilling and compacting for utilities outside the building to point of connection with public and/or private utility mains.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 2200 - Grading: Site grading.
- B. Section 31 2316 - Excavation: Building and foundation excavating.
- C. Section 31 2323 - Fill: Backfilling at building and foundations.
- D. Geotechnical Hazards and Geotechnical Engineering Report, Valley Robotics Academy, Lodi, California, December 19, 2019, by Terracon Consultants Inc., Project No. NA 195099.

**1.03 REFERENCES**

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop.
- B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- D. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)).
- F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- H. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- J. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Samples: 10 lb sample of each type of fill; submit in air-tight containers to the District's testing laboratory.
- C. Materials Sources: Submit name of imported materials source.
- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- E. Compaction Density Test Reports.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. When necessary, store materials on site in advance of need.



- B. When fill materials need to be stored on site, locate stockpiles where allowed by the Owner's representative.
  - 1. Protect stockpiles from erosion and deterioration of materials.

## **PART 2 PRODUCTS**

### **2.01 FILL MATERIALS**

- A. Backfill above Pipe Bedding: Controlled Low-Strength Material, CLSM, per Caltrans Section 19-3.02G.
- B. Granular Fill- Pea Gravel: Natural stone; washed, free of clay, shale, organic matter.
  - 1. Graded in accordance with ASTM C136/C136M, within the following limits:
    - a. Minimum Size: 1/4 inch.
    - b. Maximum Size: 5/8 inch.
- C. Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
  - 1. Graded in accordance with ASTM C136/C136M; within the following limits:
    - a. No. 4 sieve: 100 percent passing.
    - b. No. 14 sieve: 10 to 100 percent passing.
    - c. No. 50 sieve: 5 to 90 percent passing.
    - d. No. 100 sieve: 4 to 30 percent passing.

### **2.02 ACCESSORIES**

- A. Geotextile Fabric: Non-biodegradable, woven Mirafi ; 140N manufactured by Mirafi.

### **2.03 SOURCE QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that survey monuments and intended elevations for the work are as indicated.

### **3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.
- D. Protect plants, lawns, rock outcroppings and other features to remain.
- E. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.
- F. Protect existing trees and tree roots. Trenching under the dripline of existing trees shall be performed by hand using hand tools.



### 3.03 TRENCHING

- A. Notify the Geotechnical Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- G. Remove excavated material that is unsuitable for re-use from site.
- H. Stockpile excavated material to be re-used in area designated in Section 31 2200.
- I. Remove excess excavated material from site.
- J. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- K. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.
- L. Trenching under the dripline of existing trees shall be performed by hand using hand tools only. Contractor shall not cut or damage existing roots unless approved by a certified Arborist.

### 3.04 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

### 3.05 BACKFILLING

- A. Backfill to elevations indicated using unfrozen materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Correct areas that are over-excavated.
  - 1. Thrust bearing surfaces: Fill with concrete.
  - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
- G. Reshape and re-compact fills subjected to vehicular traffic.

### 3.06 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.



- B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

### **3.07 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167 or ASTM D6938.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180 or ASTM D698 ("standard Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: One test per every 100 feet of trench, or as required by the Geotechnical Engineer..

### **3.08 CLEANING**

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**



**SECTION 31 2323  
FILL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Filling, backfilling, and compacting for footings, slabs-on-grade, paving and site structures.
- B. Backfilling and compacting for utilities outside the building to utility main connections.
- C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 31 2200 - Grading: Site grading.
- D. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.
- E. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.
- F. Geological Hazards and Geotechnical Engineering Report, Valley Robotics Academy, Lodi, California, December 19, 2019, by Terracon Consultants Inc., Project No. NA 195099.

**1.03 REFERENCE STANDARDS**

- A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
- B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop.
- C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- E. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)).
- G. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- H. Standard Specifications, California State Department of Transportation (Caltrans), latest edition.
- I. Standard Specifications for Public Works Construction (the "Greenbook"), latest edition.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- D. Compaction Density Test Reports.

**1.05 DELIVERY, STORAGE, AND HANDLING**



- A. When fill materials need to be stored on site, locate stockpiles where designated.
  - 1. Protect stockpiles from erosion and deterioration of materials.

## **PART 2 PRODUCTS**

### **2.01 FILL MATERIALS**

- A. General Fill: Stripped topsoil or expansive soil with clay usable in landscape or non-structural areas.
  - 1. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
- B. Engineered Fill: Structural fill conforming to the requirements of the Geotechnical Report, and as indicated on the plans.
  - 1. Non-expansive (no clay) fill material, suitable for structural areas, with less than 3% organics by volume, and free of debris and fragments greater than 6 inches in maximum dimension, and not more than 15% larger than 2.5 inches.
  - 2. Percent passing No. 200 sieve: 15% to 50%.
  - 3. Plasticity Index (PI): 10% maximum.
  - 4. Expansion Index: 20% maximum.
  - 5. Clean sand or very sandy soil is not acceptable.
- C. Aggregate Base: Per the requirements of Section 32 11 23.
- D. Concrete for Backfill of Structures: Slurry cement per Caltrans Section 19-3.02E, 1000 psi compressive strength, minimum. Acceptable as structural Engineered Fill.
- E. Concrete for Backfill of Utility Trenches: Controlled Low-Strength Material, CLSM, per Caltrans Section 19-3.02G for bedding of storm drainage or sanitary sewer pipes, 100 psi compressive strength, minimum.
- F. Granular Fill- Pea Gravel : Natural stone; washed, free of clay, shale, organic matter.
  - 1. Graded in accordance with ASTM C136/C136M, within the following limits:
    - a. Minimum Size: 1/4 inch.
    - b. Maximum Size: 5/8 inch.
- G. Sand: Per the requirements of Section 31 23 13.16.
- H. Drain rock: Hard, durable, clean crushed stone, free of organic matter and other deleterious substances.
  - 1. Graded in accordance within the following limits:
    - a. 1 inch (25 mm) sieve: 100 percent passing.
    - b. 3/4 inch (19 mm) sieve: 80 to 100 percent passing.
    - c. 1/2 inch (12 mm) sieve: 10 to 20 percent passing.
    - d. 3/8 inch (9 mm) sieve: 0 to 10 percent passing.
    - e. No. 4 (4.75 mm) sieve: 0 to 7 percent passing.
    - f. No. 200 (75 micro m) sieve: 0 to 1 percent passing.

### **2.02 ACCESSORIES**

- A. Geotextile Fabric: Non-biodegradable, woven Mirafi ; 140N manufactured by Mirafi.
- B. Vapor Retarder: 10 mil thick, polyethylene.

### **2.03 SOURCE QUALITY CONTROL**



- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that survey bench marks and intended elevations for the Work are as indicated.
- B. Identify required lines, levels, contours, and datum locations.
- C. See Section 31 2200 for additional requirements.
- D. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- E. Verify structural ability of unsupported walls to support imposed loads by the fill.
- F. Verify areas to be filled are not compromised with surface or ground water.

#### **3.02 PREPARATION**

- A. Scarify the site in accordance with the Geotechnical Report and as indicated on the plans.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

#### **3.03 FILLING**

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
  - 1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 90 to 95 percent of maximum dry density.
  - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 90 percent of maximum dry density.
- I. Compaction Density Unless Otherwise Specified or Indicated:
  - 1. Under paving, slabs-on-grade and similar construction: 90 to 95 percent of maximum dry density as indicated in the Geotechnical Report, "Earthwork".
  - 2. At landscaped areas: 90 percent of maximum dry density.
- J. Reshape and re-compact fills subjected to vehicular traffic.



- K. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

#### **3.04 TOLERANCES**

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

#### **3.05 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor").
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Frequency of Tests: As required by the Geotechnical Engineer..
- E. Proof roll compacted fill at surfaces that will be under slabs-on-grade.

#### **3.06 CLEANING**

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**



**SECTION 32 1123  
AGGREGATE BASE COURSES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aggregate base course.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 2200 - Grading: Preparation of site for base course.
- B. Section 31 2316.13 - Trenching: Compacted fill over utility trenches under base course.
- C. Section 31 2323 - Fill: Compacted fill under base course.
- D. Section 32 1216 - Asphalt Paving: Finish and binder asphalt courses.
- E. Section 32 1313 - Concrete Paving: Finish concrete surface course.
- F. Section 33 0513 - Manholes and Structures: Manholes including frames.

**1.03 REFERENCE STANDARDS**

- A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
- B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop.
- C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- E. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)).
- G. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- H. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- I. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- J. Standard Specification of the State of California (Caltrans), latest edition.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.
- C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction Density Test Reports.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. When aggregate materials need to be stored on site, locate where directed by Owner.
- B. Aggregate Storage, General:



1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
2. Prevent contamination.
3. Protect stockpiles from erosion and deterioration of materials.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Aggregate Base: 3/4" Class 2 conforming to Caltrans Section 26 with a minimum R-value of 78.

### **2.02 SOURCE QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.
- B. Where aggregate materials are specified using ASTM D2487 classification, testing of samples for compliance will be provided before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

### **3.02 PREPARATION**

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.

### **3.03 INSTALLATION**

- A. Spread aggregate over prepared substrate to a total compacted thickness as indicated on plans.
- B. Place aggregate in maximum 4 inch layers and roller compact to specified density.
- C. Level and contour surfaces to elevations and gradients indicated.
- D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

### **3.04 TOLERANCES**

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch.
- C. Variation From Design Elevation: Within 1/2 inch.

### **3.05 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.



- B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167 or ASTM D6938.
- C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor") or ASTM D1557 ("modified Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

**3.06 CLEANING**

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**



**SECTION 32 1216  
ASPHALT PAVING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Single course bituminous concrete paving.
- B. Surface sealer.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 2200 - Grading: Preparation of site for paving and base.
- B. Section 31 2323 - Fill: Compacted subgrade for paving.
- C. Section 32 1123 - Aggregate Base Courses: Aggregate base course.
- D. Section 32 1313 - Concrete Paving

**1.03 REFERENCE STANDARDS**

- A. AI MS-2 - Asphalt Mix Design Methods.
- B. AI MS-19 - Basic Asphalt Emulsion Manual.
- C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
- D. Standard Specifications of the State of California (Caltrans), latest edition.

**1.04 QUALITY ASSURANCE**

- A. Perform Work in accordance with Standard Specifications of the State of California (Caltrans), latest edition.
- B. Mixing Plant: Conform to Standard Specifications of the State of California (Caltrans), latest edition.
- C. Obtain materials from same source throughout.

**1.05 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for paving work on public property.

**1.06 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

**1.07 FIELD CONDITIONS**

- A. Do not place asphalt when ambient air or base surface temperature is less than 50 degrees F, or surface is wet or frozen.
- B. Place bitumen mixture when temperature is not more than 15 F degrees (8 C degrees) below bitumen supplier's bill of lading and not more than maximum specified temperature.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Asphalt Concrete: Standard Specifications of the State of California (Caltrans), Section 39, Type A, 1/2 inch hot mix.
- B. Tack Coat: Emulsified asphalt.
- C. Seal Coat: Slurry Seal in accordance with the Standard Specifications of the State of California (Caltrans), Section 37-3.02
- D. Soil Sterilizer: Pramitol 25-E by CIBA CEIGY.



- E. Pavement Epoxy: Ktepx-590 by K-Lite.
- F. Crack Filler:
  - 1. Cracks up to 1/2": CAR08 by QPR
  - 2. Cracks 1/4" to 1": Docal 1100 Viscolastic by Conoco Inc.
  - 3. Cracks greater than 1": Hot Mix by Topeka

## **2.02 ASPHALT PAVING MIXES AND MIX DESIGN**

- A. Submit proposed mix design of each class of mix for review prior to beginning of work.

## **2.03 SOURCE QUALITY CONTROL**

- A. Test mix design and samples shall be in accordance with ASTM D2172, Caltrans Test Method 382, or ASTM D 4125.

# **PART 3 EXECUTION**

## **3.01 EXAMINATION**

- A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

## **3.02 PREPARATION - TACK COAT**

- A. Apply tack coat in accordance with manufacturer's instructions.
- B. Apply tack coat in accordance with the Standard Specifications of the State of California (Caltrans), Section 39-2.01C(3)(f).
- C. Apply tack coat to contact surfaces of curbs, gutters and existing pavements.

## **3.03 PLACING ASPHALT PAVEMENT - SINGLE COURSE**

- A. Install Work in accordance with the Standard Specifications of the State of California (Caltrans), latest edition.
- B. Place asphalt within 24 hours of applying primer or tack coat.
- C. Place to a maximum thickness of 4 inches.
- D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- E. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

## **3.04 SEAL COAT**

- A. Apply seal coat to surface course and asphalt curbs in accordance with the Standard Specifications of the State of California (Caltrans), Section 37.

## **3.05 TOLERANCES**

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.
- C. Variation from True Elevation: Within 1/4 inch (6 mm).

## **3.06 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for general requirements for quality control.
- B. Provide field inspection and testing. Take samples and perform tests in accordance with California Test Method 308.

## **3.07 PROTECTION**



- A. Immediately after placement, protect pavement from mechanical injury for 14 days or until surface temperature is less than 140 degrees F.

**END OF SECTION**



**SECTION 32 1313  
CONCRETE PAVING**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Parking lots.
- B. Wheel stops.
- C. Pavement marking paint.
- D. Detectable warnings.

**1.02 RELATED REQUIREMENTS**

- A. Division 03 Section Cast-in-Place Concrete
- B. Division 31 Section Earthwork
- C. Division 32 Section Concrete Paving Joint Sealants
- D. Division 32 Section Chain Link Fences and Gates

**1.03 PREINSTALLATION CONFERENCE**

- A. Conduct conference at Project site two weeks prior to start of work of this section. Required attendance of all affected installers.
  - 1. Review methods and procedures related to concrete paving, including but not limited to, the following:
  - 2. Concrete mixture design
  - 3. Testing and inspection procedures.
  - 4. Concrete finishes and finishing.
  - 5. Cold- and hot-weather concreting procedures.
  - 6. Curing procedures.
  - 7. Construction joints.
  - 8. Forms and form-removal limitations.
  - 9. Reinforcement accessory installation.
  - 10. Concrete repair procedures.
  - 11. Protection of cast-in-place architectural site concrete.
  - 12. Review special testing and inspection procedures.
  - 13. Placement sequence and schedule.
  - 14. Require representatives of each entity directly concerned with concrete paving to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete paving subcontractor.
    - e. District's Representative
    - f. Architect's Representative
    - g. Inspector of Record
    - h. Manufacturer's representative for specialty concrete paving finishes.



- i. Provide meeting minutes for pre-installation conference

#### 1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
  1. Proprietary admixtures, pigments, curing compounds, hardeners, sealers, form-release agents, etc.: Indicate compatibility with other materials used.
  2. Stenciling material
- B. Design Mixtures: Submit proposed mix designs and test data for each class of concrete and for each method of placement.
  1. Prepare mix designs on the basis of field experience (preferred) and/or trial mixes, in compliance with ACI 318-14, Section 26.4.3.
  2. Mix designs shall be prepared, stamped and signed by a structural or civil engineer registered in the State of California.
    - a. Mix designs shall be reviewed by the Architect of Record (AOR).
  3. Identify for each mix design submitted the method by which proportions have been selected.
    - a. For mix designs based on field experience, include individual strength test results, standard deviation, and required average compressive strength  $f_c$  calculations.
    - b. For mix designs based on trial mixtures, include trial mix proportions, test results, graphical analysis and show required average compressive strength  $f_c$  results. Provide gross weight and yield per cubic yard of trial mixes.
    - c. Indicate quantity of each ingredient per cubic yard of concrete and percentages.
    - d. Indicate type and quantity of admixtures proposed or required.
    - e. Indicate water to cement ratio by weight.
    - f. Measured slump.
    - g. Measured air content.
    - h. Provide shrinkage test results.
  4. Multiple mix designs or multiple manufacturers shall not be permitted for the same application.
- C. Mix designs should contain no fly ash.
- D. Submit proposed alternate design mixtures for review by the Architect and SEOR when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- E. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. Shop drawings should include details such as reveals, recessed lights, handrails, or other elements requiring steel coordination.
  1. Coordinate with and identify the details of the Contract Drawings on the shop drawings.
  2. Comply with ACI 315, part B and CRSI requirements.
- F. Construction Joint Layout: Indicate proposed construction joints required to construct the structure. Submit dimensioned drawing indicating layout of construction joints, contraction (control) joints, dowelled joints, decorative scoring and placement sequence of concrete if



different than layout indicated on plans.

1. Location of construction joints are subject to approval of the Architect.
2. All form seams are to align with construction joints or reveals.
- G. Placement Schedule: Submit concrete placement schedule before start of placement operations. Include locations of all joints including construction joints.
- H. Pavement-Marking Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.
- I. Qualification Data: For qualified ready-mix concrete manufacturer (batch plant) and installer of detectable warnings.
- J. Welding Certificates: Submit certifications signed by AWS Certified Welding Inspector of prequalified welding procedures, qualifications of welding procedures unless prequalified, qualifications of welding operators and qualifications of welders.
- K. Material Certificates: For the following, submit manufacturer data, test results, and technical information for aggregate, sand and cement, submit ½ cubic foot physical sample. For sealant submit manufacturer color standard and custom palette together with physical samples:
  1. Cementitious materials.
  2. Aggregates and sand.
  3. Steel reinforcement and reinforcement accessories.
  4. Fiber reinforcement.
  5. Admixtures.
  6. Curing compounds.
  7. Applied finish materials.
  8. Bonding agent and epoxy adhesives.
  9. Joint fillers.
  10. Sealer
  11. Sealant.
  12. Pigments.
- L. Material Test Reports: For each of the following:
  1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- M. Detectable Warning Device Warranty: Submit copies of manufacture's five year warranty for each of these products and manufacturer custom and standard color palette.
- N. Field quality-control reports.
  1. Submit copies of delivery tickets complying with ASTM C 94 for each load of concrete delivered to the site. Tickets shall include all information required by the referenced standard.
- O. Minutes of pre-installation conference.

#### **1.05 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with CBC Section 1705A.3.
  1. Chemical products field-applied to concrete shall comply with the air quality requirements of authorities having jurisdiction.



2. Comply with requirements of local, State and other authorities having jurisdiction for work performed within public right-of ways.
  - B. Chemical products field-applied to concrete shall comply with the air quality requirements of authorities having jurisdiction.
  - C. Comply with requirements of local, State and other authorities having jurisdiction for work performed within public right-of ways.
  - D. Industry Standards: Comply with the following unless modified by requirements in the Contract Documents.
    1. ACI 301, "Specifications for Structural Concrete".
    2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
    3. ACI 302.1R, "Guide for Concrete Floor and Slab Construction".
    4. ACI 304R, "Guide for Measuring, Mixing, Transporting, and Placing Concrete".
    5. ACI 305R, "Hot Weather Concreting".
    6. ACI 306.1, "Standard Specification for Cold Weather Concreting".
    7. ACI 318, "Building Code Requirements for Structural Concrete".
    8. ACI 347, "Guide to Formwork for Concrete".
    9. ACI SP-66, "ACI Detailing Manual".
    10. CRSI, "Manual of Standard Practice".
    11. CRSI, "Placing Reinforcing Bars".
  - E. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of cast-in-place, surface-applied unit-paver-type detectable truncated dome products.
  - F. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
    1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").
  - G. Source Limitations for Concrete Paving: Obtain each color, size, type, and variety of concrete material and concrete mixture from single manufacturer with resources to provide concrete of consistent quality in appearance and physical properties. Secure all material required for the duration of the project as needed to ensure consistent quality in appearance.
  - H. Welding Qualifications: Comply with CBC Chapter 17A.
    1. Qualify welding procedures and welding personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel" prior to performing any welding.
    2. Qualify welding inspection personnel according to AWS QC1, "Standard for AWS Certification of Welding Inspectors."
  - I. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
  - J. ACI Publications: Comply with ACI 301 unless otherwise indicated.
- 1.06 PROJECT CONDITIONS**
- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.



- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending, damage, and rust.
  - 1. Label bundles with durable identification tags. Maintain reinforcement identification after bundles are broken.
  - 2. Store reinforcement to avoid excessive rusting or fouling with grease, oil, dirt or other bond-weakening contaminants.
  - 3. Avoid damaging applied coatings, if any, on steel reinforcement.

### **PART 2 - PRODUCTS**

#### **2.01 FORMS**

- A. Formwork: / Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth surfaces.
  - 1. Set forms to alignment, grade and required dimensions. Formwork shall not deviate more than 1/4 inch from required vertical positions and 1/4 inch from required horizontal positions. Exposed Surfaces: Provide faced plywood panels complying with, or equivalent to, DOC PS 1, Structural I. Provide minimum 7-ply plywood and provide balance sheets for panels coated one-side only. Furnish in largest practicable sizes to minimize number of joints. Provide Medium-Density Overlay (MDO) panels or high density overlay (HDO) panels, with mill-applied release agent and edge sealant. Provide one of the following panels, or comparable substituted product:
    - a. Olympic Panel Products, "B-Matte 333 MDO Concrete Form." Overlay Color: Brown.
    - b. Pacific Laminate Products, "ProFace MDO." Overlay Color: Black.
    - c. Sylvan Products, LLC, "Armor Ply MDO" Overlay Color: Brown.
  - 2. Hold forms rigidly in place by stakes, clamps, spreaders, and braces at 3 feet on centers, and where required to ensure rigidity.
  - 3. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.
  - 4. Place joint filler or backer rod on vertical surfaces in contact with concrete paving.
  - 5. Benders or thin plank forms may be used on curves, grade changes, or curb returns. Back forms for curb returns may be made of 1/2-inch thick benders cleated together for full depth of the curb.
  - 6. Keep forms in place until concrete is sufficiently hard to prevent damage to concrete.
  - 7. Reuse of Forms:
    - a. Do not reuse forms if there is any evidence of surface wear or defect which would impair quality of surface or edge.
    - b. Thoroughly clean and properly coat forms before reuse.
    - c. Do not use forms from previous projects.
  - 8. Provide new forms specifically purchased for this project. Reuse of forms from past projects or contractors stock will not be accepted.



- B. Curved Work: Kerf back of plywood form-facing panels, or use accepted flexible or curved forms for curved work with a radius of 100 feet or less.
- C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.
  - 1. Obtain written acceptance of form release agent from integral colored concrete pigment manufacturer.
  - 2. Form-release agents shall be non-staining and can cause no visual effect to the finish.
  - 3. Formulate form-release agent with rust inhibitor for steel form-facing materials.

## 2.02 STEEL REINFORCEMENT

- A. Recycled Content: Provide steel reinforcement with an average recycled content of steel so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 60 percent.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- D. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- E. Low-Alloy-Steel Reinforcing Bars (for Welding): ASTM A 706/A 706M, Grade 60, deformed, unless otherwise indicated.
- F. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.
  - 1. Provide two-component "Speed Dowel System" manufactured by Greenstreak.
- G. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- H. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- I. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
  - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
- J. Zinc Repair Material: ASTM A 780.

## 2.03 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
  - 1. Portland Cement: ASTM C 150, Type II/V, Type I/II or Type IV, gray, unless white cement is required to achieve colors indicated. Supplement with the following:
    - a. Fly Ash: none accepted.
- B. Normal-Weight Aggregates: ASTM C 33, complying with building code. Provide aggregates from a single source. All aggregates shall be free of materials with deleterious reactivity to alkali in cement when tested in accordance with ASTM C 289.
  - 1. Comply with ACI 318-14, Section 26.4.1.2.
  - 2. Maximum Coarse-Aggregate Size: 1 inch nominal.



- a. Source: Reliance, Vulcan, San Gabriel, or Carrol Canyon
  - b. Hard rock mix; no pea gravel will be accepted.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
  - a. Source: Reliance, Foster, Corona
  - b. Color to be white to light no dark material.
- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Shrinkage-Reducing Admixture: Commercially formulated, shrinkage inhibitor capable of reducing initial shrinkage by 80% and long-term shrinkage by 50%. Provide product suitable for use with either air-entrained or non-air-entrained concrete as appropriate to structural member and project location.
  1. Products: Subject to compliance with requirements, provide one of the following(as required):
    - a. Euclid Chemical Company (The), an RPM company; EUCON SRA, SRA+.
    - b. Grace Construction Products, W. R. Grace & Co.; Eclipse Floor, Eclipse Plus.
    - c. Sika Corporation; Control 40.

#### **2.04 CURING MATERIALS**

- A. Water: Potable.
- B. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete. Provide products with not more than 100g/L volatile organic content.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Construction Chemicals, LLC; Confirm.
    - b. Conspec by Dayton Superior; Aquafilm.
    - c. Nox-Crete Products Group; MONOFILM.
- C. Clear, Waterborne, Membrane-Forming Curing Compound (Colored Concrete): Provide products that are acceptable to concrete color pigment manufacturer complying with ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of sealers with no glossy finish and compatible with specified sealer. Provide products with not more than 100g/L volatile organic content.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Sinak Corporation; The Cure WCE or Lithium Cure 1000.
    - b. L. M. Scofield; Cureseal-W.
    - c. Butterfield Color; Clear Guard H2O.
- D. All curing materials should be dissipating without leaving a shiny, cloudy, or glossy finish. Curing material does not substitute requirement of a sealer.

#### **2.05 HARDENERS AND SEALERS**

- A. Penetrating Liquid Floor and Horizontal Surface Treatment (Sealer): Clear, chemically reactive, waterborne solution of inorganic silicate or silicate water-based lithium quartz materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces. Materials shall be compatible with concrete admixtures and shall be recommended by manufacturer for intended use. Provide product with 0g/L volatile organic content.



1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Sinak Corporation; Concrete Sealer HLQ 125.
  - b. L. M. Scofield; Cureseal-W.
  - c. Butterfield Color; Clear Guard H2O.
  - d. BASF Construction Chemicals - Building Systems; Kure-N-Harden.
  - e. Dayton Superior Corporation; Edoco by Dayton Superior; Titan Hard.
  - f. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
  - g. L&M Construction Chemicals, Inc.; Seal Hard.

#### **2.06 AGGREGATE BASE**

- A. Granular Fill: Class II crushed aggregate per Section 26 of Cal-Trans standards. Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

#### **2.07 RELATED MATERIALS**

- A. Joint Fillers:
  1. Deck-O-Foam polyethylene closed cell expansion joint filler by W.R. Meadows.
  2. 1/4" thickness.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- C. Bonding Agent: ASTM C 1059, Type II, non-re-emulsifiable. Provide proprietary products composed of latex polymers.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. W. R. Meadows, Inc.; "Acry-Lok".
    - b. Grace Construction Products, W. R. Grace & Co.; "Daraweld C".
    - c. Larsen Products Corp., "Weld-Crete".
- D. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:
  1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete, and for anchoring dowels to hardened concrete.

#### **2.08 DETECTABLE WARNING MATERIALS**

- A. General: All detectable warning systems shall comply with Americans with Disabilities Act (28 CFR Part 36 ADA Standards for Accessible Design, Appendix A, Section 4.29.2 Detectable Warnings on Walking Surfaces), and CBC requirements (Section 11B-247, 11B-705 and others). All detectable warning materials shall have raised truncated domes with a base diameter of nominal 0.90 inch (22.9 mm), tapering to a top diameter of 0.45 inch (11.4 mm), a height of nominal 0.20 inch (5.08 mm), and a center-to-center spacing of 2.35 inches (59.7 mm) nominal. The orientation of the dome pattern for all panels shall be parallel with the panel edges. Detectable warning materials shall visually contrast with surrounding areas.
  1. California Compliance Warranty: All detectable warning systems shall be approved by DSA-AC. If not approved, DSA will accept a written five (5) year product warranty



provided by the manufacturer of detectable warning products and directional surfaces. Such warranty shall indicate compliance with architectural standards as published in the current edition of the California Building Standards Code, and also include durability criteria which indicate that the shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly for at least five (5) years after initial installation. As defined by the State, "not degrade significantly" means that the product maintains at least 90 percent of its approved design characteristics, as determined by the enforcing agency.

- B. Concrete Paver Detectable Dome Warning System: Provide standard size precast architectural concrete paving units for installation in concrete beds.
  - 1. Basis-of Design Product: Provide the following, or comparable substitute product:
    - a. Acker-Stone Industries, Inc., ADA Pavers-Truncated Domes.
      - 1) Size: per approved plans and details. Nominal 12 inches by 12 inches by 2 3/8 inches (4.7 cm by 4.7 cm by 6 cm).
      - 2) Color: per approved plans and details. As selected by Architect from manufacturer's complete range.
    - b. Tectura designs - ADA-2 Truncated dome pavers.
      - 1) 12 inches by 12 inches nominal(actual 11.8 inches X 11.8 inches) by 2 3/8 inches
      - 2) Color as selected by Architect from manufacturer's complete range.

## 2.09 PAVEMENT MARKINGS

- A. Color: As indicated.
- B. Pavement-Marking Paint: MPI #97 Latex Traffic Marking Paint; paint to be at least as slip resistant as the adjacent surface.
  - 1. Color: White unless otherwise indicated. Use for non-accessible striping, directional arrows, numbering, and lettering.
  - 2. Accessibility Color: Paint accessibility lines and markings blue color equal to Color No. 15090 per Federal Specification 595C.

## 2.10 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2500-psi minimum compressive strength. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
  - 1. Dowels: Galvanized steel, 5/8 inch in diameter, 18-inch minimum length.

## 2.11 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
  - 2. Proportioning:
    - a. The proportioning of ingredients shall be such that the concrete can be readily worked into forms and around reinforcement under the conditions of placement to be used, without segregation or excessive bleeding.
    - b. When proportioning by weight of loose, dry material, 94 pounds of cement shall be considered 1 cubic foot.



- 1) Float/Broom Finish: Coarse aggregate 50 percent-50 percent fine aggregate.
    - 2) Retarder finish: Coarse aggregate 40 percent, fine aggregate 60 percent.
    - 3) Exposed Aggregate Finish: Coarse aggregate 65 percent, fine aggregate 35 percent.
    - 4) Abrasive blast finish: Coarse aggregate 40 percent, fine aggregate 60 percent.
  - c. Total water content shall not exceed 35 gallons per cubic yard of concrete.
  - d. Weighing equipment shall be accurate within 1 pound and shall be adjustable for varying aggregate moisture content.
  - e. A beam auxiliary shall register any part of the last 100 pounds of each aggregate. The aggregate hopper shall have a volume adjustment.
3. Prepare compressive strength data for both 7-day and 28-day strengths.
  - a. The 7-day compressive strength shall be at least 60 percent of the required 28-day strength.
  - b. The 28-day compressive strength shall be as indicated.
  - c. Provide drying shrinkage test data at 28 days, from not less than 3 test specimens.
- B. When automatic machine placement is used, prepare and submit design mixtures suitable for use with machine placement, including reduced slump as required. Obtain laboratory test results that meet or exceed requirements.
- C. Proportion mixtures to provide normal-weight concrete with the following properties:
  1. Typical Compressive Strength (28 Days): Provide the following minimum compressive strength (28 days) for concrete paving unless otherwise indicated: 3000 psi.
  2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50
  3. Slump Limit: 4 inches, plus or minus 1 inch, unless indicated otherwise.
    - a. Slump Limit (High-Range Water-reducing Admixture): 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture, plus or minus 1 inch, unless indicated otherwise.
    - b. Slump Limit (Plasticizing Admixture): 8 inches for concrete with verified slump of 2 to 4 inches before adding plasticizing admixture, plus or minus 1 inch, if required.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement. Limit total chloride-ion content in hardened concrete to 0.10 percent by weight of concrete when tested per AASHTO T 260 potentiometric titration.
- E. Limit "drying shrinkage" after 28 days of curing hardened concrete to 0.045 percent of the original concrete volume.
- F. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- G. Chemical Admixtures: Admixtures may only be used if they are incorporated into the accepted concrete mix designs. Use admixtures according to manufacturer's written instructions.
  1. Use water-reducing admixture in concrete as required for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.



3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

## **2.12 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
  1. When air temperature is between 85 and 90 deg. F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg. F (32 deg. C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
- C. For concrete batches of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
- D. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
- E. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
  1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
  2. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Earth Moving."
- C. Proceed with concrete paving installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

### **3.03 EDGE FORMS AND SCREED CONSTRUCTION**

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.
- C. Slope stair and step treads at not less than 1.0 percent and not more than 2.0 percent cross slope to drain.

### **3.04 STEEL REINFORCEMENT**



- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

### 3.05 JOINTS

- A. General: Form construction, isolation or expansion joint, and saw cut / contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
  - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Isolation (Expansion) Expansion Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
  - 1. Locate expansion joints at intervals of 20 feet maximum unless otherwise indicated.
  - 2. Extend joint fillers full width and depth of joint and recess 1 inch from finish surface where no joint sealant is indicated.
  - 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
  - 4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
  - 5. Break steel at expansion joints.
  - 6. Dowels- provide prefabricated 'speed dowel' assemblies.
- C. Saw Cut (Control) Joints: Form weakened-plane saw cut joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth plus 1/4 inch of the concrete thickness, as follows, and to match jointing of existing adjacent concrete paving:
  - 1. Continue steel reinforcement across sawcut joints unless otherwise indicated.
- D. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/8-inch radius unless otherwise noted. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

### 3.06 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in. Notify other trades as necessary to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.



- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, and side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels and joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Slip-Form Paving: Use accepted design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
- L. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- M. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
  - 1. When air temperature has fallen to or is expected to fall below 40 deg. F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg. F (10 deg C) and not more than 80 deg. F (27 deg C) at point of placement.
  - 2. Do not use frozen materials or materials containing ice or snow.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- N. Hot-Weather Placement: Comply with ACI 305R (ACI 305R M) and as follows when hot-weather conditions exist:
  - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg. F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
- O. Provide sand and base materials as indicated.

### 3.07 FLOAT/ BROOM FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.



- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
  - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture. Required to meet slip coefficient requirement.
  - 2. Portland cement concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Sections 11B-302 and 11B-403.

### 3.08 DETECTABLE WARNINGS

- A. Detectable Warnings, General: Install detectable warnings as part of the concrete paving placement sequence. Set true to line and elevation. Comply with maximum slope and cross-slope requirements for accessible walkways.
  - 1. Blockouts: Form blockouts in concrete and asphalt pavements for installation of detectable paving units.
    - a. Tolerance for Opening Size: Plus 1/4 inch, no minus.
- B. Detectable warnings surfaces shall comply with **CBC Section 11B-705.1**.
- C. Detectable warning surfaces shall be yellow conforming to FS 33538 of Federal Standard 595C, except for locations at curb ramps, islands, or cut through medians where color used shall contrast visually with that of adjacent walking surfaces, either light-on-dark or dark-on-light. **CBC Sections 11B-705.1.1.3**.
- D. Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact. **CBC Section 11B-705.1.1.4**.
- E. Provide 5 year minimum warranty per DSA.
- F. Precast Detectable Warning Tiles: Comply with approved plans and details along with manufacturer's written instructions.
- G. Surface-Mounted Detectable Warning Tiles: Comply with manufacturer's written instructions. Do not install directly over asphalt pavements.
- H. For installation at asphalt pavements, comply with installation indicated on Drawings. If not indicated, provide one of the following installation methods:
  - I. Saw-cut and remove asphalt pavement in location of warning tile to a minimum depth of 6 inches. Replace removed pavement materials with reinforced concrete paving materials. When cured, install surface-mounted detectable warning tiles.
  - J. Provide 0.032 inch aluminum separation sheet cut to same size as surface mounted tiles. Adhere sheet to asphalt paving with a thin coat of urethane adhesive, holding adhesive 1 inch from edge of sheet. Install surface-mounted detectable warning tiles to sheet with adhesive and mechanical fasteners per manufacturer's written instructions.
- K. Cast-in-Place Detectable Warning Pavers: Integrate into installation of unit pavers. Comply with manufacturer's written instructions.
- L. Cast-in-Place Detectable Warning Grooves: Install detectable warnings as part of the concrete paving placement sequence. Set true to line and elevation. Form well-defined, clean grooves with appropriate tools.

### 3.09 CONCRETE PROTECTION, CURING AND SEALING:

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.



- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.
- F. Seal Concrete: Apply specified sealer in accordance with manufacturer's recommendations.
  - 1. Apply full strength in two coats with airless sprayer at the manufacturer's recommended rate.
  - 2. After the first coat is completely dry, apply second coat at right angles to the first coat.

### 3.10 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117, the Americans with Disabilities Act, the CBC and as follows:
  - 1. Elevation: 1/8 inch.
  - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
  - 3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/8 inch. Surface must properly drain.
  - 4. Surface Discontinuities: Maximum 1/4 inch, subject to further limitations of accessible routes.
  - 5. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
  - 6. Lateral Alignment and Spacing of Dowels: 1/4 inch.
  - 7. Vertical Alignment of Dowels: 1/8 inch.
  - 8. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/8 inch per 12 inches of dowel.



9. Joint Spacing: 3 inches, except joint position shall be within 1/4 inch of objects in alignment with joint such as benches, light poles, pull boxes, etc.
10. Sawcut Joint Depth: Plus 1/4 inch, no minus.
11. Joint Width: Plus 1/16 inch, no minus.
- B. Stair Treads: Stair treads within a run shall be constructed equally and shall shed water away from the path of travel. Maximum tread slope down from riser to nosing in direction of travel: 1.0 percent, plus or minus 0.5 percent. Maximum tread cross-slope perpendicular to direction of travel: 2.0 percent, plus 0.0 percent, minus 1.0 percent or as required to shed water.
- C. Ramps: Ramps shall shed water away from the path of travel. Maximum ramp slope in direction of travel: 8.33 percent. Maximum ramp cross-slope perpendicular to direction of travel: 2.0 percent, plus 0.0 percent, minus 1.0 percent or as required to shed water.

### 3.11 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils. Provide markings with a minimum width of 3 inches.
  1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
  2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb./gal.
- E. Accessible parking spaces serving a particular building or facility shall be located, and dispersed if serving more than one accessible entrance, on the shortest accessible routes to an entrance or to multiple accessible entrances. **CBC Section 11B-208.3.1.**
- F. Accessible parking spaces in a parking facility not serving a particular building or facility shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility. **CBC Section 11B-208.3.1.**
- G. Minimum number of required accessible parking spaces shall be provided in accordance with **CBC Table 11B-208.2** for each parking facility provided.
- H. For every six or fraction of six accessible parking spaces, at least one shall be an accessible van parking space. **CBC Section 11B-208.3.1.**
- I. Accessible parking spaces and access aisles shall comply with **CBC Section 11B-502** and shall be dimensioned to the centerlines of the marked lines as follows:
  1. Parking spaces and access aisles shall be marked according to **CBC figures 11B-502.2, 11B-502.3, and 11B-502.3.3**. Their surfaces shall comply with **CBC Section 11B-302** and shall be at the same level with the slopes not steeper than 1:48 in any direction. **CBC Section 11B-502.4.**
  2. Parking spaces shall be 9'x18' minimum and van parking spaces shall be 12'x18' minimum with an adjacent access aisle of 5'x18' minimum. Access aisles shall be placed on either side of the parking spaces except be located on the passenger side for van parking spaces. Van parking spaces shall be permitted to be 9'x18' minimum



where the access aisle is 8'x18' minimum.

3. Access aisles shall be marked by a blue painted borderline around their perimeter. The areas within the blue borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface, preferably blue or white. Access aisle markings may extend beyond the minimum required length. **CBC Section 11B-502.3.3**
4. Access aisles (parking spaces as well- similar application) shall not overlap the vehicular way. **CBC Section 11B-502.3.4**
5. A vertical clearance of 8'-2" minimum shall be provided for accessible parking spaces, access aisles, and vehicular routes serving them. **CBC Section 11B-502.5**
- J. At least one passenger loading zone shall be provided in every continuous 100 linear feet of loading zone space, or fraction thereof, complying with **CBC Section 11B-209 and 11B-503** as follows:
  1. Vehicle pull-up spaces shall be 8' x 20' minimum. Access aisles shall be 5' x 20' minimum and shall be adjacent and parallel to the vehicular pull-up spaces. They shall be the same level with slopes not steeper than 1:48 in any direction. **CBC Section 11B-503.4.**
  2. Access aisles for passenger drop-off and loading zones shall be marked with a painted borderlines around their perimeter. The areas within the borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface. **CBC Section 11B-503.3.**
  3. A vertical clearance of 9'-6" minimum shall be provided for vehicle pull-up spaces, access aisles, and a vehicular route serving them connecting a vehicular entrance and a vehicular exit. **CBC Section 11B-503.5.**

### 3.12 WHEEL STOPS

- A. Securely attach wheel stops to paving with not less than two #5 galvanized steel dowels, minimum 24 inches long, located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

### 3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  1. Testing Frequency: Obtain at least one composite sample for each 20 cu. Yd., or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg. F and below and when it is 80 deg. F and above, and one test for each composite sample.



5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
  - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Owner, Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

### **3.14 REPAIRS AND PROTECTION**

- A. Remove and replace concrete paving that is broken, damaged, cracked, chipped, stained or defective or that does not comply with requirements in this Section as determined by Landscape Architect. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with Portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude all but pedestrian traffic from paving for at least 28 days after placement. When construction traffic is permitted, maintain paving as clean as possible by providing adequate surface protection and by removing surface stains and spillage of materials as they occur.
  1. Rubber tire marks are unacceptable in the completed construction.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Project Completion inspections.
- E. Repair of damaged, defective or rejected concrete is not permitted. Remove all concrete from expansion joint to expansion joint or greater as required to provide a constant continuous finish.



### **3.15 FINAL CLEANING**

- A. Remove all excess concrete, form materials, over pours, waste, etc., and legally dispose off-site.
- B. Provide a final acid and power wash for all concrete paving surfaces. Do not use any material that will affect the appearance of the concrete.
- C. All over pours in planting areas should be removed prior to landscape operations.
- D. Clean concrete paving to remove stains, markings, dust, and debris.

**END OF SECTION**



**SECTION 32 1373  
PAVEMENT JOINT SEALERS**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES: RELATED DOCUMENTS**

- A. Exterior joint sealant for non-traffic surfaces.

**1.02 RELATED REQUIREMENTS**

- A. Division 32 Section Concrete Paving.
- B. Division 32 Section Architectural Site Concrete

**1.03 SUBMITTALS**

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch- (13-mm-), and 1/4-inch (6.4-mm) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

**1.05 DELIVERY, STORAGE, AND HANDLING**

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

**1.06 PROJECT CONDITIONS**

- A. Do not proceed with installation of joint sealants under the following conditions:
- B. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (4.4 deg C).
- C. When joint substrates are wet or covered with frost.
- D. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
- E. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

**2.02 MATERIALS, GENERAL**



- A. **Compatibility:** Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. **Colors of Exposed Joint Sealants:** As selected by Landscape Architect from manufacturer's full range.

#### **2.03 ELASTOMERIC JOINT SEALANTS**

- A. **Elastomeric Sealants:** Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. **Stain-Test-Response Characteristics:** Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

#### **2.04 JOINT-SEALANT BACKER MATERIALS**

- A. **General:** Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
- B. **Round Backer Rods for Cold- and Hot-Applied Sealants:** ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. **Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.**

#### **3.02 PREPARATION**

- A. **Surface Cleaning of Joints:** Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. **Joint Priming:** Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

#### **3.03 INSTALLATION OF JOINT SEALANTS**

- A. **General:** Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. **Sealant Installation Standard:** Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. **Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.**
  - 1. Do not leave gaps between ends of backer materials.
  - 2. Do not stretch, twist, puncture, or tear backer materials.
  - 3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.



- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses provided for each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.
- F. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

#### **3.04 CLEANING**

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

#### **3.05 PROTECTION**

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

#### **3.06 SCHEDULE**

- A. Horizontal Joints, less than 5 percent slope; Sealant No. 1.
- B. Horizontal Joints, grades steeper than 5 percent; Sealant No. 2
- C. Vertical Joints; Sealant No. 2

**END OF SECTION**



**SECTION 32 1723.13  
PAINTED PAVEMENT MARKINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols and curb markings.
- B. Roadway lane markings and crosswalk markings.
- C. "No Parking" curb painting.

**1.02 RELATED REQUIREMENTS**

- A. Section 32 1216 - Asphalt Paving.

**1.03 REFERENCE STANDARDS**

- A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association.
- B. California MUTCD - Manual on Uniform Traffic Control Devices for Streets and Highways; State of California Department of Transportation (FHWA's MUTCD as amended for use in California); current edition.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**1.06 FIELD CONDITIONS**

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Line and Zone Marking Paint: MPI (APL) No. 97 Latex Traffic Marking Paint; color(s) as indicated.
  - 1. Parking Lots: White.
  - 2. Handicapped Symbols: Blue.
  - 3. Fire Lane ("No Parking"): Red with white lettering.
- B. Temporary Marking Tape: Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

**PART 3 EXECUTION**



### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.02 PREPARATION

- A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces thoroughly prior to installation.
  - 1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
  - 2. Completely remove rubber deposits, existing paint markings, and other coatings adhering to the pavement, by scraping, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.
- D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.
- E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.
- F. Temporary Pavement Markings: When required or directed by Architect, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
  - 1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
  - 2. At Contractor's option, temporary marking tape may be used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Owner.

### 3.03 REQUIREMENTS

- A. Accessible parking spaces serving a particular building or facility shall be located, and dispersed if serving more than one accessible entrance, on the shortest accessible routes to an entrance or to multiple accessible entrances. **CBC Section 11B-208.3.1.**
- B. Accessible parking spaces in a parking facility not serving a particular building or facility shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility. **CBC Section 11B-208.3.1.**
- C. Minimum number of required accessible parking spaces shall be provided in accordance with **CBC Table 11B-208.2** for each parking facility provided.
- D. For every six or fraction of six accessible parking spaces, at least one shall be an accessible van parking space. **CBC Section 11B-208.2.4.**
- E. Accessible parking spaces and access aisles shall comply with **CBC Section 11B-502** and shall be dimensioned to the centerline of the marked lines as follows:
  - 1. Parking spaces and access aisles shall be marked according to **CBC Section 11B-502.2, 11B-502.3, and 11B-502.3.3**. Their surfaces shall comply with **CBC Section 11B-302** and shall be at the same level with slopes not steeper than 1:48 in any direction. **CBC Section 11B-502.4.**



2. Parking spaces shall be 9' x 18' minimum and van parking spaces shall be 12' x 18' minimum with an adjacent access aisle of 5' x 18' minimum. Access aisles shall be placed on either side of the parking spaces except be located on the passenger side for van parking spaces. Van parking spaces shall be permitted to be 9' x 18' minimum where the access aisle is 8' x 18' minimum.
  3. Access aisles shall be marked by a blue painted borderline around their perimeter. The area within the blue borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface, preferably blue or white. Access aisle markings may extend beyond the minimum required length. **CBC Section 11B-502.3.3.**
  4. Access aisles (parking spaces as well - similar application) shall not overlap the vehicular way. **CBC Section 11B-502.3.4.**
  5. A vertical clearance of 8'-2" minimum shall be provided for accessible parking spaces, access aisles, and vehicular routes serving them. **CBC Section 11B-502.5**
- F. At least one passenger loading zone shall be provided in every continuous 100 linear feet of loading zone space, or fraction thereof, complying with **CBC Section 11B-209 and 11B-503** as follows:
1. Vehicle pull-up spaces shall be 8' x 20' minimum. Access aisles shall be 5' x 20' minimum and shall be adjacent and parallel to the vehicular pull-up spaces. They shall be the same level with slopes not steeper than 1:48 in any direction. **CBC Section 11B-503.4.**
  2. Access aisles for passenger drop-off and loading zones shall be marked with a painted borderlines around their perimeter. The areas within the borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface. **CBC Section 11B-503.3.**
  3. A vertical clearance of 9'-6" minimum shall be provided for vehicle pull-up spaces, access aisles, and a vehicular route serving them connecting a vehicular entrance and a vehicular exit. **CBC Section 11B-503.5.**
- G. Bus loading zones and bus stops shall comply with **CBC Sections 11B-209 and 11B-810.2** as follows:
1. Boarding and alighting areas shall be 8' x 5' minimum, with 8' measured perpendicular to the curb or vehicle roadway edge, and with 5' measured parallel to the vehicle roadway. Slopes in 8' direction shall be 1:48 maximum. Slopes in 5' direction shall be the same as that of the roadway, to the maximum extent practicable. **CBC Figure 11B-810.2.2.**
  2. Bus shelters shall provide a minimum 30" x 48" clear floor or ground space (36" x 48" or 36" x 60" as applicable in an alcove), with slopes not steeper than 1:48 in any direction, entirely within the shelter complying with **CBC Section 11B-305.**
  3. Bus shelters shall be connected by an accessible route complying with **CBC Section 11B-402** to a boarding and alighting area complying with **CBC Section 11B-810.2.** **CBC Figure 11B-810.3.**

### 3.04 INSTALLATION

- A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.
- B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.
- C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.



- D. Comply with California MUTCD manual for details not shown.
- E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.
- F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
  - 1. Length Tolerance: Plus or minus 3 inches.
  - 2. Width Tolerance: Plus or minus 1/8 inch.
- G. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
  - 1. Mark the International Handicapped Symbol at indicated parking spaces.
  - 2. Hand application by pneumatic spray is acceptable.
- H. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

### **3.05 DRYING, PROTECTION, AND REPLACEMENT**

- A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.
- B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.
- C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.
- D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.
- E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.
- F. Replace removed markings at no additional cost to Owner.

### **END OF SECTION**



**SECTION 32 3113  
CHAIN LINK FENCES AND GATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fence framework, fabric, and accessories.
- B. Excavation for post bases; concrete foundation for posts.
- C. Manual gates and related hardware.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete anchorage for posts.
- B. Section 32 3136 - Security Gates and Barriers: Powered sliding gate.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
- F. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.
- G. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric.
- H. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework.
- I. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
- J. ASTM F1665 - Standard Specification for Poly(Vinyl Chloride)(PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence.
- K. CLFMI CLF 2445 - Product Manual - Drawings.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.
- C. Shop Drawings: Indicate in plan layout and elevation, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.
- D. Manufacturer's Installation Instructions: Indicate installation requirements , post foundation anchor bolt templates,.
- E. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

**PART 2 PRODUCTS**



## 2.01 MATERIALS

- A. Posts, Rails, and Frames: ASTM F1083 Schedule 40 hot-dipped galvanized steel pipe, welded construction, minimum yield strength of 30 ksi.
- B. Wire Fabric: ASTM A 392 zinc coated steel chain link fabric.

## 2.02 COMPONENTS

- A. As noted and shown on the drawings; the following are provided as minimum dimensions Unless Noted Otherwise.
- B. Line Posts: 2.38 inch diameter.
- C. Corner and Terminal Posts: 4.0 inch.
- D. Vehicular Gate Posts: 4.5 inch diameter.
- E. Pedestrian Gate Posts: 4.0 inch (100 mm) diameter.
- F. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
- G. Pedestrian Gate Frame: 1.66 inch diameter for welded fabrication.
- H. Vehicular Gate Frame: 1.90 inch (48 mm) diameter for welded fabrication.
- I. Fabric: 1 inch diamond mesh interwoven wire, 9 gage, 0.1144 inch thick, top selvage knuckle end closed, bottom selvage twisted tight.
- J. Tension Wire: 6 gage, 0.1620 inch thick steel, single strand.
- K. Tension Band: 3/8 inch thick steel.
- L. Tie Wire: Aluminum alloy steel wire.

## 2.03 ACCESSORIES/ HARDWARE

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.
- C. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; fork latch with gravity drop and padlock hasp ; keeper to hold gate in fully open position.
- D. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, padlock hasp ; keepers to hold gate in fully open position.
- E. Privacy Slats: Vinyl strips, sized to fit fabric weave.
- F. Gates that are part of the accessible route shall meet all the requirements of an accessible door in compliance with **CBC Section 11B-404**.
- G. The lever of lever actuated latches or locks for an accessible gate shall be curved with a return to within 1/2" of the (face of) gate to prevent catching on the clothing or persons. **California Referenced Standards code. T-24 part 12, Section 12-10-202, Item (F)**.
- H. Swing doors and gate surfaces within 10" of the finish floor or ground shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16" of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped. **CBC Section 11B-404.2.10**
- I. The clear opening width for a door shall be 32" minimum. For a swinging doors it shall be measured between the face of the door and the stop, with the door open 90 degrees. There shall be no projections into it below 34" and 4" maximum projections into it between 34" and 80" above the finish floor or ground. Door closers and stops shall be permitted to be 78"



minimum above the finish floor or ground. **CBC Section 11B-404.2.3**

- J. Handles pulls, latches, locks, and other operable parts on accessible doors shall comply with **CBC Section 11B-309.4** and shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34" minimum and 44" maximum above finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides. **CBC Section 11B-404.2.7**
- K. The force for pushing or pulling open a door shall be as follows: **CBC Section 11B-404.2.9**
  - 1. Interior hinged doors, sliding or folding doors: **5 pounds(22.2N)** maximum. Required fire doors: the minimum opening force allowable by the DSA authority, not to exceed **15 pounds (67N)**. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.
  - 2. The force required for activating any operable parts, such as lever hardware, or disengaging other devices shall be 5 pounds(22.2 N)maximum to comply with CBC Section 11B-309.4
- L. Door closing speed shall be as follows: **CBC Section 11B-404.2.8**
  - 1. Closer shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is **5 seconds min.**
  - 2. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is **1.5 seconds minimum.**
- M. Thresholds shall comply with **CBC Section 11B-404.2.5**
- N. Floor stops shall not be located in the path of travel and 4" maximum from walls. **DSA Policy 99-08.**
- O. Hardware (including panic hardware) shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met per **DSA Interpretation 10-08 DSA/AC (External), revised 4/28/09**. Such conditions must be clearly demonstrated and indicated in the specifications:
  - 1. Such hardware has a 'dogging' feature.
  - 2. It is dogged during the time the facility is open.
  - 3. Such 'dogging' operation is performed only by employees as their job function(non-public use).
- P. Pair of doors: limit swing of one leaf to 90 degrees so that a clear floor space is provided beyond the arc of the swing for the wall-mounted tactile sign. **CBC Section 11B-703.4.2**

## 2.04 FINISHES

- A. Components (Other than Fabric): Galvanized in accordance with ASTM A123/A123M, at 1.7 oz/sq ft.
- B. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.
- C. Accessories: Same finish as framing.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567.
- B. Place fabric on outside of posts and rails.
- C. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.



- D. Line Post Footing Depth Below Finish Grade: ASTM F 567.
- E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F 567.
- F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- H. Install center brace rail on corner gate leaves.
- I. Do not stretch fabric until concrete foundation has cured 28 days.
- J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- K. Position bottom of fabric 2 inches above finished grade.
- L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- N. Install bottom tension wire stretched taut between terminal posts.
- O. Install support arms sloped inward and attach barbed wire; tension and secure.
- P. Do not attach the hinged side of gate to building wall; provide gate posts.
- Q. Install hardware and gate with fabric and barbed wire overhang to match fence.
- R. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
- S. Ground fence in accordance with Section 33 7900.

### 3.02 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Position: 1 inch.
- C. Components shall not infringe adjacent property lines.

**END OF SECTION**



**SECTION 32 3136  
SECURITY GATES AND BARRIERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Security gates.
- B. Controls and related wiring.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 0533.13 - Conduit for Electrical Systems: Empty conduit between system components.
- B. Section 26 0583 - Wiring Connections: Electrical power connections to the hydraulic power unit and controls.
- C. Section 32 3113 - Chain Link Fences and Gates

**1.03 REFERENCE STANDARDS**

- A. ASTM F2200 - Standard Specification for Automated Vehicular Gate Construction.
- B. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate installation of units with size, location and installation of service utilities.
- B. Preinstallation Meeting: Conduct a preinstallation meeting two weeks prior to the start of work of this section; require attendance by affected installers.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Provide detailed drawings showing:
  - 1. Electrical schematic including associated wiring, showing electrically connected components, including interface points for connection to equipment; indicate minimum conduit size and number of wires required to run between each component of the barrier equipment.
- C. Operation and Maintenance Data.
- D. Maintenance Contracts.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

**1.07 DELIVERY, STORAGE AND HANDLING**

- A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

**1.08 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Security Gates and Barriers:



1. Linear; [www.linearproaccess.com](http://www.linearproaccess.com).

## **2.02 SECURITY GATES**

- A. Security Gates: Materials as required under Section 32 3113 Chain Link Fences and Gates. Factory-fabricated, assembled, devices, including components for satisfactory operation; location and size as indicated on drawings. Gate minimum requirements:
  1. 6 5/8" min. OD HF40 gate posts and caps.
  2. 4" min. OD HF40 latch posts and caps.
  3. 6 5/8" x 2 1/2" min. nylon cantilever rollers with top and bottom fit safety covers.
  4. Slide gate hatch.
  5. 2 1/2" OD horizontal rails.
  6. 2" OD vertical bracing.
  7. 1 5/8" OD diagonal bracing.
  8. Gate counter balance.
  9. Concrete footing not less than 24" diameter by 60" deep.
- B. Comply with UL 325 and installation compliant with ASTM F2200.
- C. Operation: Sliding Cantilever
- D. Main Operator Basis of Design:
  1. Manufacturer: Linear. Model: HSLG-1 Commercial grade.
  2. 1 HP, 208 VAC, 3-phase.
  3. Integral Apex controller UL 991 compliant.
  4. Double V-belt.
  5. #40 roller drive chain.
  6. Galvannealed steel cabinet, powder coat finish.
  7. Post mounted.
  8. Remote cable kit (outside the gate access)
- E. Photo Eye Sensor: 2 units

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of Conditions:
  1. Verify location of existing utilities, grades and conditions of substrate.
  2. Verify integration requirements with other site security equipment including but not limited to card readers, tire puncture devices, gates and other automated barrier systems.

### **3.02 PREPARATION**

- A. Protect existing work from damage due to installation of this work.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for additional requirements.

### **3.05 SYSTEM STARTUP**



- A. Provide manufacturer's field representative to observe systems startup.
- B. Prepare and start equipment in accordance with manufacturers' instructions and recommendations.
- C. Adjust for proper operation within manufacturer's published tolerances.

**3.06 CLEANING**

- A. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

**3.07 CLOSEOUT ACTIVITIES**

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Demonstrate proper operation of equipment to Owner's designated representative.
- C. Training: Train Owner's personnel on operation and maintenance of the barrier.
  - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
  - 2. Provide minimum of two hours of training.

**3.08 PROTECTION**

- A. Protect installed units from subsequent construction operations.

**END OF SECTION**