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DIVISION 32 – EXTERIOR IMPROVEMENTS

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.
6. Miscellaneous provisions.

1.2 PROJECT INFORMATION

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Install (1) existing portable building onsite, including the associated site work, wood foundation, plumbing work, electrical work, accessible ramps and chain link fence and gate.

B. Type of Contract.

1. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

A. Coordinate with the construction manager for access to site.

1.5 GENERAL REQUIREMENTS

A. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. Contractor shall assess the condition of the building onsite and provide a list of existing damages prior to relocation. Contractor is responsible for patching/fixing damages that are not on that list after building installation is completed.

C. Contractor shall coordinate with the District and/or District hired contractors for portable installation.

D. Coordinate staging area and temporary fencing with the District. Contractor shall provide 6' high temporary fence with green screen at the Owner's discretion as directed. Provide all necessary temporary signs as needed to comply all locate codes and regulations.

E. All work shall be in compliance with current codes and regulations, including but not limited to California Building Code, California Plumbing Code, California Electrical Code, Cal OSHA. Whether indicated on the drawings or not, Contractor is responsible for providing additional items/components/systems needed in order to comply.

F. There will be separate contractors working in the building. Contractor is responsible for coordinating work with other contractors as needed to avoid conflicts.

1.6 SPECIFICATION AND DRAWING CONVENTIONS

A. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.3 ACTION 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 CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed 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, 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.
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 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on District's standard forms.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Refer to the project General Conditions for instruction.

B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Construction Manager.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Refer to project General Conditions for instruction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values. Refer to project General Conditions for requirements.

1. Coordinate 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 through Construction Manager at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

a. Project name and location.
b. 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 the District’s standards.

3. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
4. 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.
5. 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.
6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Requests for Information (RFIs).
2. Project meetings.

B. Related Requirements:

1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.2 DEFINITIONS

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

1.3 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use the District's standard form (if any) and 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.

1.4 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

1.5 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

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

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect 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 shall always provide suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: District’s standard form.

D. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven (or as indicated in the General Condition, whichever is longer) 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 coordination information already indicated in the Contract Documents.
d. Requests for adjustments in the Contract Time or the Contract Sum.
e. Requests for interpretation of Architect's actions on submittals.
f. Incomplete RFIs or 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 Section 012600 "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 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use CSI Log Form 13.2B.

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect and Construction Manager.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's and Construction Manager's response was received.

F. 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.

1.6 PROJECT MEETINGS

A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and Architect, within three 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 15 days after execution of the Agreement.

1. 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.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Critical work sequencing and long-lead items.
    c. Designation of key personnel and their duties.
    d. Procedures for processing field decisions and Change Orders.
    e. Procedures for RFIs.
    f. Procedures for testing and inspecting.
    g. Procedures for processing Applications for Payment.
    h. Distribution of the Contract Documents.
    i. Submittal procedures.
    j. Preparation of record documents.
    k. Use of the premises and existing building.
    l. Work restrictions.
    m. Working hours.
    n. Owner's occupancy requirements.
    o. Responsibility for temporary facilities and controls.
    p. Procedures for moisture and mold control.
    q. Procedures for disruptions and shutdowns.
    r. Construction waste management and recycling.
    s. Parking availability.
    t. Office, work, and storage areas.
    u. Equipment deliveries and priorities.
    v. First aid.
    w. Security.
    x. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Daily construction reports.
3. Site condition reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Float: The measure of leeway in starting and completing an activity.

1. Float time belongs to Owner.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.
3. Two paper copies.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

C. Daily Construction Reports: Submit at weekly intervals.

D. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and 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 Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 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 30 days for completion of punch list items and final completion.

C. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion

D. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. CPM Schedule: 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.

    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup 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. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Purchase of materials.
    d. Delivery.
    e. Fabrication.
    f. Utility interruptions.
    g. Installation.
    h. Testing and commissioning.
    i. Punch list and final completion.
    j. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

D. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

E. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Approximate count of personnel at Project site.

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

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. 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.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
2. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.3 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

b. Contractor shall execute a data licensing agreement as required by the architect prior to the release of the digital files.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 30 days (or as stated in the General Condition, whichever is longer) for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Simply copying the contractor document details and include them as part of the contractor submittal is not acceptable.
4. Include the following information for processing and recording action taken:

a. Project name.
b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Name of subcontractor.
f. Name of supplier.
g. Name of manufacturer.
h. Submittal number or other unique identifier, including revision identifier.

1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Location(s) where product is to be installed, as appropriate.
l. Other necessary identification.

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

a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software electronic form acceptable to Owner**,** containing the following information:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of firm or entity that prepared submittal.
g. Names of subcontractor, manufacturer, and supplier.
h. Category and type of submittal.
i. Submittal purpose and description.
j. Specification Section number and title.
k. Specification paragraph number or drawing designation and generic name for each of multiple items.
l. Drawing number and detail references, as appropriate.
m. Location(s) where product is to be installed, as appropriate.

n. Related physical samples submitted directly.
o. Indication of full or partial submittal.
p. Transmittal number, numbered consecutively.
q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.
e. Insert required information.

F. Options: Identify options requiring selection by Architect.

G. Deviations: Identify deviations from the Contract Documents on submittals.

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

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's and Construction Manager's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

1. Post electronic submittals as PDF electronic files directly to Architect's FTP site or other online construction administration tool specifically established for Project.

a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. If acceptable to the construction manager and the architect, submit electronic submittals via email as PDF electronic files.

    a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

3. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
4. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

    a. PDF electronic file.

b. Three paper copies of Product Data unless otherwise indicated. Architect, through Construction Manager, will return two copies.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

   a. PDF electronic file.
   b. Two opaque (bond) copies of each submittal. Architect will return one copy(ies).
   c. Three opaque copies of each submittal. Architect will retain two copies; remainder will be returned.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit sets of Samples. Architect and Construction Manager will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

      1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Submit product schedule in the following format:

   a. PDF electronic file.
   b. Three paper copies of product schedule or list unless otherwise indicated. Architect will return two copies.

F. Coordination Drawings Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures.

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

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

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

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

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

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

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

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

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

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

U. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000 "Quality Requirements."

V. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

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

X. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

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

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

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

3.2 ARCHITECT'S ACTION

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

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

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

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

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

F. Review stamp: Architect’s review stamp does not relieve the contractor’s responsibility to fully comply with the contract document.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. 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.
2. Specific test and inspection requirements are not specified in this Section.

1.2 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.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

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, e.g., 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: An entity engaged to perform specific tests, inspections, or both. 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(s).

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.

1.3 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.

1.4 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

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

1.5 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, 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 Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

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

1.6 QUALITY ASSURANCE

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

B. 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 in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's 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.

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. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
d. When testing is complete, remove test specimens, assemblies, [and]mockups[, and laboratory mockups]; do not reuse products on Project.

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. Demonstrate the proposed range of aesthetic effects and workmanship.
2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
3. Demolish and remove mockups when directed unless otherwise indicated.

K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

1.7 QUALITY CONTROL

A. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

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

C. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
3. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
4. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "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

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

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

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

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

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

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

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

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

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

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

1.2 INDUSTRY STANDARDS

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

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

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

B. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; http://dodssp.daps.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; http://eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeia; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

C. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
3. DSA – Division of the State Architects
4. DSCC - Defense Supply Center Columbus; (See FS).
5. FED-STD - Federal Standard; (See FS).
6. FS - Federal Specification; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

7. MILSPEC - Military Specification and Standards; (See DOD).
8. USAB - United States Access Board; www.access-board.gov.
9. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

D. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

1. CBHF - State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR - California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS - California Department of Health Services; (See CDPH).
4. CDPH - California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC - California Public Utilities Commission; www.cpuc.ca.gov.
6. DSA – Division of the State Architects
7. SCAQMD - South Coast Air Quality Management District; www.aqmd.gov.
8. TFS - Texas Forest Service; Forest Resource Development and Sustainable Forestry; http://txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 014523 - TESTING AND INSPECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Testing and inspection services to meet requirements of the California Building Code (CBC), Title 24, Parts 1 and 2, as indicated on the Drawings.

B. A DSA certified inspectors employed by the OWNER in accordance with the requirements of California Building Standards Administrative Code will be assigned to the Work with their duties as specifically defined in Section 4-333(b).

C. Tests of materials are required by a DSA certified testing agency as set forth in Section 4-335 of the California Building Standards Administrative Code.

1.02 RELATED SECTIONS

A. Section 011000: Summary
B. Section 012500: Substitution Procedures
C. Section 013300: Submittal Procedures
D. Section 017700: Closeout Procedures

PART 2 – PRODUCTS (Not applicable)

PART 3 – EXECUTION

3.01 TESTS

A. OWNER will select an independent testing agency to conduct tests, sampling, and testing of materials. Selection of material to be tested shall be by the agency and not by CONTRACTOR.

B. Any material shipped from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from IOR such testing and inspection is not required shall not be incorporated into the Work.

C. OWNER will select and directly reimburse testing agency the costs for all DSA and/or DSA required tests and inspections, but may be reimbursed by CONTRACTOR for such costs as noted in related sections of the Contract Documents.

D. The independent testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work. The agency shall not perform any duties of CONTRACTOR.

3.02 TEST REPORTS

A. Test reports shall include all tests performed, regardless of whether such tests indicate the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. Reports shall indicate the material or materials were sampled and tested in accordance with requirements of CBC, Title 24, Parts 1 and 2, as indicated on the Drawings. Test reports shall indicate specified design strength. They shall also definitely state whether or not material or materials tested comply with the specified requirements.

3.03 VERIFICATION OF TEST REPORTS

A. Each testing agency shall submit to the Division of the State Architect a verified report in duplicate covering tests which are required to be performed by that agency during progress of the Work. Such report shall be furnished each time construction on the Work is suspended, covering tests up to that time, and prior to Final Completion of the Work, covering all tests.

3.04 INSPECTION BY OWNER

A. OWNER and its representatives shall at all times have access, for purpose of inspection, to all parts of the Work and to shops wherein the Work is in preparation, and CONTRACTOR shall at all times maintain proper facilities and provide safe access for such inspection.

B. OWNER shall have the right to reject materials and/or workmanship deemed defective Work, and to require correction. Defective workmanship shall be corrected in a satisfactory manner and defective materials shall be removed from the premises and legally disposed of, all without charge to OWNER. If CONTRACTOR does not correct such defective Work within a reasonable time, fixed by written notice and in accordance with the terms and conditions of the Contract Documents, OWNER may correct such defective Work and proceed in accordance with related Articles of the Contract Documents.

C. CONTRACTOR is responsible for compliance to all applicable local, state, and federal regulations regarding codes, regulations, ordinances, restrictions, and requirements.

3.05 INSPECTOR OF RECORD

A. Inspector of Record is employed by OWNER in accordance with requirements of Title 24 of the California Code of Regulations with their duties specifically defined therein.

B. Inspection of Work shall not relieve CONTRACTOR from any obligation to fulfill all of the terms and conditions of the Contract Documents.

C. CONTRACTOR shall be responsible for scheduling times of inspection, tests, sample taking, and similar activities of the Work.

3.06 TESTS AND INSPECTIONS

A. The following tests and inspections do not limit inspection of the Work but are required by DSA, other agencies, or are required in related Sections of the Contract Documents.

B. Excavations, Foundations and Retaining Walls - CBC, Chapter 18A

C. Concrete - CBC, Chapter 19A:

1. Materials:

a.	Test of Materials	1903A.1
b.	Portland Cement Tests	1903A.2
c.	Concrete Aggregate	1903A.3
d.	Shotcrete Aggregate	1903A.3; 1924A.3
e.	Reinforcing Bars	1903A.5.1; 1903A.5.2; 1903A.5.3; 1903A.5.4;
f.	Prestressing Steel & Anchorage	1903A.5.5;
g.	Structural Steel, Steel Pipe or tubing	1903A.5.6
h.	Admixtures	1903A.6

2. Quality:

	a.	Proportions of Concrete	1905A.1; 1905A.2; 1905A.3; 1905A.4; 1905A.5; 1905A.6,
	b.	Mixing and Placing	1905A.1.1; 1905A.1.2; 1905A.1.3
	c.	Concrete Testing	1905A.6;
	d.	Test Of Shotcrete	1905A.6; 1924A.10
	e.	Composite Construction Cores	1929A.8
	f.	Gypsum Concrete Strength Tests	1925A.1; 1929A.13
	g.	Insulating Concrete Tests	DSA IR 27-1

3. Inspection:

	a.	Project Site Inspection	1905A.7.1
	b.	Batch Plant or Weigh-master Inspection	1929A.4, 1929A.5; 1929A.6
	c.	Pre-stressed Concrete Inspection	1929A.9
	d.	Shotcrete Inspection	1929A.10
	e.	Reinforcing Bar Welding Inspection	1929A.12, 1903A.10

D. Lightweight Metal - CBC, Chapter 20A:

1. Materials:

	a.	Alloys	2001A.2
	b.	Identification	2001A.4

2. Inspection:

	a.	Welding	2004A.8

E. Masonry - CBC, Chapter 21A:

1. Materials:

a.	Masonry Units	2102A.2,4,5,6
b.	Portland Cement	2102A.2.2
c.	Mortar & Grout Aggregates	2102A.2.1; 2103A.4.3
d.	Reinforcing Bars	2102A.2.10; 1903A5, 2102A.2.10

2. Quality:

a.	Portland Cement Tests	1903A.2
b.	Mortar & Grout Tests	2105A.3.4.2
c.	Masonry Prism Tests	2105A.3.2, 2105A3.5
d.	Masonry Core Tests	2105A 3.1
e.	Reinforcing Bars	2102A.2.10

3. Inspection:

a.	Reinforced Masonry	2105A
b.	Reinforcing Bar Welding Inspection	1903A.10

F. Steel - CBC, Chapters 17A & 22A:

1. Materials:

a.	Structural Steel	2202A.1
b.	Material Identification	2203.A4

2. Inspection and Tests:

a.	Test of Structural Steel	2231.A
b.	Tests of High Strength Bolts, Nuts, and Washers	2231.A.2

	c.	Tests of End Welded Studs	2231.A.3
	d.	Shop Fabrication Inspection	2231.A.4
	e.	Welding Inspection	2231.A.5
	f.	High Strength Bolt Inspection	2231A.6
	g.	Steel Joist Load Tests	2231A.7
	h.	Spray applied fire resistance materials	1701

G. Wood - CBC, Chapter 23A:

1. Materials:

a.	Lumber and Plywood Grading	2303A.1, 2304A
b.	Glue - Laminated Members	2303A.2, 2304A

2. Inspection:

a.	Glue - Laminated Fabrication	2337A.1
b.	Timber Connectors	2337A.2
c.	Manufactured Trusses	2337A.3

H. Exterior Wall Coverings - CBC, Chapter 14A, 25A:

1. Materials:

a.	Portland Cement Plaster	2508A, 2509A, 2510A

2. Inspection:

a.	Veneer Inspection	1405A

END OF SECTION 014523

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. 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.

1.3 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.

1. 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.

1.4 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.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

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

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written 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. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties 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.

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.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

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.
    b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

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.

2.2 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 (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
3. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

B. Certified Surveys: Submit two copies signed by land surveyor professional engineer.

C. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS

2.1 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 Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, 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. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility 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 Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.

B. General: Engage a land surveyor professional engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as 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.

3.4 FIELD ENGINEERING

A. 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.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

D. 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.

1. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. 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.

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.

3.6 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 Section 014000 "Quality Requirements"

3.7 PROTECTION OF INSTALLED CONSTRUCTION

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

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

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 024119 "Selective Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 90 percent by weight of total non-hazardous solid waste generated by the Work. Facilitate recycling and salvage of materials.

1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

1.5 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

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

B. 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.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

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

G. Qualification Data: For waste management coordinator.

1.6 QUALITY ASSURANCE

A. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.7 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 construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract. Please note that there will be no staging area available onsite. Contractor shall remove all trash and waste on a daily basis. No overnight trash / waste bins will be allowed onsite.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within 3 days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Donation: Permitted on Project site.

C. Salvaged Items for Owner's Use:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by the construction manager.
5. Protect items from damage during transport and storage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Receivers and Processors.

C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.

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 they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Grind asphalt to maximum 1-1/2-inch 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 size.

D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Pulverize masonry to maximum 3/4-inch size.
2. Clean and stack undamaged, whole masonry units on wood pallets.

E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

F. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

J. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

K. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

L. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

M. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

N. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

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

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site (on a daily basis) 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. All trash / waste shall be removed from the jobsite on a daily basis to avoid conflict with the District's daily operations.
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. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

D. Disposal: Remove waste materials and dispose of at designated spoil areas on Owner's property.

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

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:
1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

1.3 CLOSEOUT SUBMITTALS

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Construction Manager. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Construction Manager's signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

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

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

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.

1. Organize list of spaces in sequential order, starting with exterior areas first andproceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Submit list of incomplete items in the following format:

    a. MS Excel electronic file. Architect, through Construction Manager, will return annotated copy.
    b. PDF electronic file. Architect, through Construction Manager, will return annotated copy.
    c. Three Insert number paper copies unless otherwise indicated. Architect, through Construction Manager, will return two copies.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

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

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
p. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

D. Professional cleaning: Contractor shall also employ a professional cleaning company to perform a final clean for all interior and exterior areas.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

1.2 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 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:

C. 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

2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

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.

B. 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.

C. 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.

D. 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.

E. 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.

F. 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.

G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. 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. 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.

2.2 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.

2.3 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 is 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.

2.4 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.

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.

2.5 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.

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.

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.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. 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.

D. 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.

E. 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.

F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Record data as soon as possible after obtaining it.
c. Record and check the markup before enclosing concealed installations.

2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect and Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: DWG DXF DGN, Version , Microsoft Windows operating system.
3. Format: Annotated PDF electronic file with comment function enabled.
4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
5. Refer instances of uncertainty to Architect through Construction Manager for resolution.
6. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. 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. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect and Construction Manager.
    e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file paper copy scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file paper copy scanned PDF electronic file(s) of marked-up paper copy of Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

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

B. Format: Submit miscellaneous record submittals as PDF electronic file paper copy scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

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

END OF SECTION 017839

SECTION 064116 – PLASTIC LAMINATE ARCHITECTURAL CABINETS AND COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Plastic-laminate-faced countertops.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

1.2 SUBMITTALS

A. General: Shop drawings and product submittals shall be provided by Woodwork Institute (WI) certified contractor.

B. Product Data: For each type of product including high-pressure decorative laminate, adhesive for bonding plastic laminate and cabinet hardware and accessories.

C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

D. Samples:

1. Plastic laminates, for each color, pattern, and surface finish.
2. Thermoset decorative panels, for each color, pattern, and surface finish.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: WI Accredited Millwork Company

B. Installer Qualifications: Licensee of WI's Certified Compliance Program

1.4 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.

1. Provide certificates from WI certification program indicating that woodwork, including installation, complies with requirements of grades specified.

B. Grade: Custom.

C. Certified Wood: Plastic-laminate cabinets shall be made from wood products certified as "FSC Pure" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and FSC STD-40-004, "FSC Standard for Chain of Custody Certification."

D. Type of Construction: Frameless.

E. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.

F. High-Pressure Decorative Laminate (VGS): NEMA LD 3, as required by woodwork quality standard.

1. Manufacturers (Basis of Design): Wilsonart or approved equal.

G. Colors and Patterns for exposed laminate surfaces : To be selected by the District from the Manufacturer’s full range of colors and patterns.

2.2 PLASTIC-LAMINATE-FACED COUNTERTOPS

A. Countertop configuration: Self-Edged with Bull Splash.

1. Edge Treatment: PVC-mold matching laminate with Narrow Build Up.

B. High-Pressure Decorative Laminate (HGS): NEMA LD 3, as required by woodwork quality standard.

1. Manufacturers (Basis of Design): Wilsonart or approved equal.

C. Colors and Patterns for exposed laminate surfaces (Basis of Design): To be selected by the District from the Manufacturer’s full range of colors and patterns.

2.3 MATERIALS

A. Provide materials that comply with requirements of referenced quality standard for each type of grade specified.

1. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.

    a. Thickness: ¾”
    b. Use at cabinets and countertops.

2. Thermoset Decorative Overlay: Medium-density fiberboard with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1

    a. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semi-exposed edges.
    b. Color and pattern: Match adjacent.

2.4 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware per ANSI/BHMA standards (latest edition) Grade1. Comply with CBC 1126B.4 for all pull hardware.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 165 degrees of opening. Automatic closing shall engage only in the last 10 degrees of swing.

1. Basis of Design: Series 3000 by Grass America, Inc. or approved equal.
2. Quantity: As recommended by the manufacturer base on the size of cabinets.
3. Finish: Bright Nickel, BHMA 619 brass/bronze or 646 steel.

C. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter. BHMA A156.9, B02011.

D. Catches: Magnetic catches, BHMA A156.9, B03141

E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081

F. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

G. Drawer Slides: BHMA A156.9.
1. Provide positive stop, side-mounted, full extension, zinc-plated steel drawers slides with steel ball bearings.
2. Basis of Design: No. 3640A Accuride, Inc. 200 pound capacity minimum, up to 42” wide.

H. Door and Drawer Silencers: BHMA A156.16, L03011. Rubber, approximately ¼” diameter, color compatible with adjacent finish.

I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

2.5 MISCELLANEOUS MATERIALS

A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors.

B. Adhesives: Do not use adhesives that contain urea formaldehyde.

C. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Adhesive for Bonding Plastic Laminate: As recommended by laminate manufacturer (Low VOC content.

2.6 FABRICATION

A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Contractor shall remove existing finish and install backing as required. Patch wall to match existing adjacent.

C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or screws for exposed fastening, countersunk and filled flush with woodwork.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

END OF SECTION 064116

SECTION 096519 – RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
    1. Flooring and accessories as shown on the drawings and schedules and as indicated by the requirements of this section.
B. Related Documents
    1. Drawings and General Provisions of the Contract (including General and Supplementary Conditions and Division 1 sections) apply to the work of this section.

1.2 REFERENCES

A. Armstrong Flooring Technical Manuals
    1. Armstrong Flooring Guaranteed Installation Systems manual, F-5061
    2. Armstrong Flooring Maintenance Recommendations and Procedures, manual, F-8663
B. ASTM International:
    1. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
    2. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
    3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
    4. ASTM F 1066 Standard Specification for Vinyl Composition Tile
    5. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
    6. ASTM F 1861 Standard Specification for Resilient Wall Base
    7. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
    8. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
C. National Fire Protection Association (NFPA):
    1. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
    2. NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials
D. Canadian Standards
    1. CAN/ULC-S102.2 Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Provide flooring which has been manufactured, fabricated and installed to performance criteria certified by manufacturer without defects, damage, or failure.
B. Administrative Requirements

1. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

C. Sequencing and Scheduling
    1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.

1.4 SUBMITTALS

A. Submit shop drawings, seaming plan, coving details, product data (including base, adhesive, etc.) and manufacturer's technical data, installation and maintenance instructions (latest edition of Armstrong Flooring Guaranteed Installation Systems manual, F-5061) for flooring and accessories.

B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.

C. Closeout Submittals: Submit the following:
    1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
    2. Warranty: Warranty documents specified herein

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.

B. Select an installer who is experienced and competent in the installation of Armstrong resilient vinyl composition tile flooring and the use of Armstrong Flooring subfloor preparation products.
    1. Engage installers certified as Armstrong Commercial Flooring Certified Installers
    2. Confirm installer's certification by requesting their credentials

C. Fire Performance Characteristics: Provide resilient vinyl composition tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
    1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
    2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less
    3. CAN/ULC-S102.2 – Flame Spread Rating and Smoke Developed – Results as tested.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with Division 1 Product Requirements Sections

B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.

D. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.7 PROJECT CONDITIONS

A. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65ºF (18ºC) and a maximum temperature of 85ºF (29ºC) for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55ºF (13ºC) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to the Armstrong Flooring Guaranteed Installations Systems manual, F-5061 for a complete guide on project conditions.

1.8 LIMITED WARRANTY

A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.

B. Limited Warranty Period: 5 years

C. Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

1.9 EXTENDED SYSTEM LIMITED WARRANTY

A. Resilient Flooring System: Submit a written warranty executed by the manufacturer, agreeing to repair or replace system (subfloor preparation products, adhesive, and floor covering) that fails within the warranty period.

B. Limited Warranty Period: 10 years on top of the Resilient Flooring Limited Warranty

C. The installation of an Armstrong Flooring product along with the recommended Armstrong Flooring adhesive, as well as any one of the Strong System subfloor preparation products listed above, provides 10 additional years of limited warranty coverage. The Strong System limited warranty covers the installation integrity for the length of the flooring product warranty plus 10 years. In order to qualify for the Strong System Warranty, any subfloor preparation product needed for an installation must be an Armstrong Flooring product.

D. For the System Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

E. When Armstrong Flooring Strong System subfloor preparation products are used with other manufacturers' floor coverings, adhesives, or other subfloor preparation products, Armstrong Flooring warrants our products to be free from manufacturing defects from the date of purchase through the limited warranty period of 15 years.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Resilient tile flooring, wall base, adhesives and subfloor preparation products and accessories:

District Standard: Armstrong Flooring Inc., 2500 Columbia Avenue, Lancaster, PA 17604, www.armstrongflooring.com/commercial

2.2 RESILIENT TILE FLOORING MATERIALS

1. Description: Tile composed of polyvinyl chloride resin, plasticizers, fillers, stabilizers and pigments with colors and texture dispersed uniformly throughout its entire thickness.
2. Vinyl composition tile shall conform to the requirements of ASTM F 1066, "Standard Specification Vinyl Composition Floor Tile", Class 2, through-pattern
3. Pattern and Color: Camel Beige
4. Size: 12 in. x 12 in. (305 mm x 305 mm)
5. Thickness: 1/8"/0.125 in.

2.3 WALL BASE MATERIALS

A. For top set wall base: Provide 1/8 in. thick, 4 in. high Armstrong Flooring Color-Integrated Wall Base with a matte finish, conforming to ASTM F 1861, Type TP - Rubber, Thermoplastic, Group 1 - Solid, Style B – Cove.

2.5 ADHESIVES

A. For Tile Installation System, Full Spread: Provide Armstrong S-750 Premium Floor Tile Adhesive under the tile and Armstrong S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer. Verify with manufacturer for compatibility.

2.6 ACCESSORIES

A. For priming porous substrates to aid in adhesive bond strength and reducing subfloor porosity, provide S-454 Prime Strong™ acrylic primer for porous substrates. For non-porous substrates, provide S-455 Prime Strong™ acrylic primer for non-porous substrates.

B. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.

C. Provide transition/reducing strips tapered to meet abutting materials.

D. Provide threshold of thickness and width as shown on the drawings.

E. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the Architect from standard colors available.

F. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage, or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.

3.2 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).

B. Visually inspect flooring materials, adhesives and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.

C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.

D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.

E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.3 PREPARATION

A. Prepare subfloor per manufacturer's written instruction.

B. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers and other

foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate they must be mechanically removed prior to the installation of the flooring material.. Refer to the Armstrong Flooring Guaranteed Installation Systems manual, F-5061 and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.

C. For Tile Installation System, Full Spread when using S-700 or S-750 adhesive, perform subfloor moisture testing in accordance with methods recommended by the manufacturer and Bond Tests as described in the Armstrong Flooring Guaranteed Installation Systems manual, F-5061, to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Relative humidity shall not exceed 80%. MVER shall not exceed 5 lbs./1000 sq. ft./24 hrs.On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

D. Wood subfloors: Armstrong resilient floors are recommended on suspended wood subfloors with a 1/4" underlayment (see product installation systems for exceptions) and a minimum of 18" of well-ventilated air space below. Armstrong Flooring does not recommend installing resilient flooring on wood subfloors applied directly over concrete or on sleeper-construction subfloors. Loading requirements for subfloors are normally set by various building codes on both local and national levels. Trade associations such as APA–The Engineered Wood Association provide structural guidelines for meeting various code requirements. Subfloor panels are commonly marked with span ratings showing the maximum center-to-center spacing in inches of supports over which the panels should be placed.

    1. Refer to the Armstrong Flooring Guaranteed Installation Systems manual, F-5061 and ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring for additional information.

E. Wood subfloors - Surface Cleaning: Make subfloor free from dust, dirt, grease, and all foreign materials.

    1. Check panels for sources of discoloration such as contamination from paint, varnish, stain overspray or spills, plumbing sealers, asphalt, heater fuel, markers or potential staining agents such as wood or bark not visible on the surface, edge sealers, logo markings, printed nail patterns and synthetic patches.

    2. Remove old adhesive.

    3. Cover adhesive, oil or wax residue with an appropriate underlayment. If the residue is tacky, place a layer of felt or polyethylene sheeting over it to prevent a cracking sound when walking on the floor.

    4. Remove all paint, varnish, oil and wax from all subfloors. Many buildings constructed before 1978 contain lead-based paint, which can pose a health hazard if

not handled properly. State and federal regulations govern activities that disturb lead-based painted surfaces and may also require notice to building occupants. Do not remove or sand lead-based paint without consulting a qualified lead professional for guidance on lead-based paint testing and safety precautions. Armstrong Flooring does not recommend the use of solvents to remove paint, varnish, oil, wax or old adhesive residues because the solvents can remain in the subfloor and negatively affect the new installation. Whenever sanding, be certain the work site is well ventilated and avoid breathing dust. If high dust levels are anticipated, use appropriate National Institute for Occupational Safety and Health (NIOSH) designated dust respirator. All power sanding tools must be equipped with dust collectors. Avoid contact with skin or eyes. Wear gloves, eye protection and long-sleeve, loose fitting clothes

5. For additional information on the installation and preparation of wood and board-type underlayments see the current edition of ASTM F1482, "Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring."
6. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring.

3.4 INSTALLATION OF FLOORING

A. Install flooring in strict accordance with the latest edition of Armstrong Flooring Guaranteed Installation Systems manual, F-5061. Failure to comply may result in voiding the manufacturer's warranty listed in Section 1.08.

B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.

D. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.

E. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.5 INSTALLATION OF ACCESSORIES

A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.

B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.

C. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.

D. Apply [butt-type] [overlap] metal edge strips as recommended by the manufacturer, before flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

3.6 CLEANING

A. Perform initial and on-going maintenance according to the latest edition of Armstrong Guaranteed Flooring Installation Systems manual, F-5061.

3.7 PROTECTION

A. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings. (See Finishing The Job in the latest edition of Armstrong Flooring Guaranteed Installation Systems manual, F-5061.)

END OF SECTION 096519

SECTION 099123 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Existing painted surface
2. Ferrous metal
3. Interior wall board
4. Other items indicated on the drawings

B. Scope of work:

1. Contractor shall paint all factory primed products including but not limited to doors, frames, access panels, etc.
2. Contractor shall paint all new work that is exposed to view including but not limited to ramps, handrails, wood foundation cover plates, ramp skirts, etc.
3. Schedule: Contractor shall submit a paint schedule indicating all of the paint systems that will be used for the project. Contractor shall submit paint systems for substrates that are not specified in the contract document but required to complete the project. Contractor shall also verify the compatibility of the products against the substrate and each other. Consult with the manufacturer.

1.2 SUBMITTALS

A. Schedule: Provide a list of products (primers and top coats) for all of the substrates applicable to the project.

B. Product Data: For each type of product indicated.

C. Samples: For each finish and for each color and texture required.

D. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.3 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. District Standard Manufacturer: Scotch Paint Corporation
555 W 189th St, Gardena, CA 90248, Tel: 310-329-1259

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with SCAQMD and the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Flat Paints, Coatings, and Primers: VOC content of not more than 5 g/L or less.
2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 5 g/L or less.
3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 5 g/L or less.
4. Floor Coatings: VOC not more than 5 g/L or less.
5. Shellacs, Clear: VOC not more than 5 g/L or less.
6. Shellacs, Pigmented: VOC not more than 5 g/L or less.
7. Flat Topcoat Paints: VOC content of not more than 5 g/L or less.
8. Nonflat Topcoat Paints: VOC content of not more than 5 g/L or less.
9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 5 g/L or less.
10. Floor Coatings: VOC not more than 5 g/L or less.
11. Shellacs, Clear: VOC not more than 5 g/L or less.
12. Shellacs, Pigmented: VOC not more than 5 g/L or less.
13. Primers, Sealers, and Undercoaters: VOC content of not more than 5 g/L or less.
14. Dry-Fog Coatings: VOC content of not more than 5 g/L or less.
15. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 5 g/L or less.
16. Pre-Treatment Wash Primers: VOC content of not more than 5 g/L or less.

D. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Restricted Components: Paints and coatings shall not contain any of the following:

a. Acrolein.
b. Acrylonitrile.
c. Antimony.
d. Benzene.
e. Butyl benzyl phthalate.
f. Cadmium.
g. Di (2-ethylhexyl) phthalate.
h. Di-n-butyl phthalate.
i. Di-n-octyl phthalate.
j. 1,2-dichlorobenzene.
k. Diethyl phthalate.
l. Dimethyl phthalate.
m. Ethylbenzene.
n. Formaldehyde.
o. Hexavalent chromium.
p. Isophorone.
q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

E. Colors:
1. Arizona White (Main building wall) Semigloss
2. Sedona Red (Trim other than Coping At Fascia) Semigloss
3. Other locations: As selected by the District from manufacturer's full range. Provide custom color as requested by the District.

F. Low-Emitting Materials: Interior paints and coating shall comply with the testing and product requirements of the California Department of Health Services “Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.”

G. Colorants: The use of colorants containing hazardous chemicals, such as ethylene glycol, is prohibited.

H. Thinning: Not permitted, unless specifically recommended by the manufacturer.

2.2 PRIMERS

A. Typical for all surfaces / substrates: Compatible with the specified 100% Acrylic paint system. Follow the manufacturer’s recommendation and submit a product for review.

2.3 100% ACRYLIC PAINTS

A. 455 Duracryl (Flat)

B. 470 Duraglow (Semi gloss)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Comply with the Surface Preparation Standards published by the Society for Protective Coatings (SSPC).

C. Remove existing peeling and unstable paint down to the substrate as needed and prep the surface to receive new primer and paint system.

D. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

E. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

F. Painting Electrical and Plumbing Work:
   a. Existing Panelboard.
   b. Condensate drain pipe

G. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

H. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 PAINTING SCHEDULE

A. Ferrous Metal Substrates:

1. 100% Acrylic paint system:

a. Prime Coat: As recommended by the manufacturer.
b. Intermediate Coat: 470 Duraglow (Semigloss)
c. Topcoat: 470 Duraglow (Semigloss)

B. Interior Wall finish:

1. 100% Acrylic paint system:
a. Prime Coat: As recommended by the manufacturer.
b. Intermediate Coat: 455 Duracryl (Flat)
c. Topcoat: 455 Duracryl (Flat)

C. Building Exterior:

1. 100% Acrylic paint system:

a. Prime Coat: N/A – existing painted surface
b. Intermediate Coat: 470 Duraglow (Semigloss)
c. Topcoat: 470 Duraglow (Semigloss)

D. Plaster Substrates:

1. Latex System: MPI INT 9.2A.

a. Prime Coat: Interior latex stucco/plaster primer/sealer.
b. Intermediate Coat: Interior latex matching topcoat.
c. Topcoat: Interior latex (flat).

END OF SECTION 099123

SECTION 22 05 00

PLUMBING SYTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. All labor, materials and equipment for a complete and operable plumbing system, consisting of water supply, waste and vent for future connections as indicated, storm drain, hot and cold water, fuel gas, and waste and vent systems for new plumbing fixtures including all fittings, valves, trenching, backfilling, saw cutting, sleeves, rough-in and final connections to equipment as specified and as indicated on the drawings and unless otherwise herein specified, shall be complete, tested and ready for use.

2. The work includes, but is not necessarily limited to the following:

b. Mechanical Equipment Services: Rough-in and all final connections for condensate waste services to mechanical equipment, as indicated and as specified.
c. Plumbing labor, materials and equipment and rough-in and all final connections to all equipment and fixtures requiring such connections, whether such equipment and fixtures are furnished under this section or under other sections of these specifications or not indicated on the drawings or specifications, which are required for proper operation of the systems, in accordance with the true intent and meeting of the Contract Documents, shall be provided and incorporated in the work by and at the expense of the Contractor.
d. All necessary drilling, cutting and patching required for the work. Repair all concrete slabs as necessary. Patching materials and finish shall match the surrounding work.

1.02 EXAMINATION OF SITE

A. Before bidding on this Work, the Contractor shall thoroughly familiarize himself with all existing conditions and the requirements of the Project.

1. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and to accept all conditions presented in the Drawings, herein specified or at the site.
2. No request for additional payment will be considered as valid due to failure to allow for conditions, which may exist. All openings through roofs and walls shall be acceptable by the District's representative.

1.03 PERMITS AND INSPECTIONS

A. All work shall comply with requirements of all applicable codes, laws, ordinances, regulations and other authorities having jurisdiction.

B. Secure and pay for all required licenses and inspections involved with the performance of this work on this Project and shall arrange for all inspections with the I.O.R as required by the District.

C. Corrections for items of construction or method of installation that may be required by the I.O.R and District shall be promptly accomplished without additional cost to the District.

1.04 COORDINATION

A. Coordinate this Work with the work of other trades to expedite the Project progress.

B. Work closely with all trades making certain all items are covered. No change orders will be allowed for any discrepancies arising between the trades.

1.05 CLOSING IN WORK

A. Do not allow any of work of this Section to be enclosed or covered up until approved by IOR. If any work is covered up before such inspection and approval, uncover it, and after it has been inspected, tested and approved, restore it to its original condition at no additional cost to the District.

1.06 RESPONSIBILITY

A. Be responsible for the safety and good condition of all material and equipment of the entire installation until final acceptance of work by the District.

1.07 VERIFICATION OF DIMENSIONS

A. All scaled and figured dimensions are approximate and are provided for scope intent purposes only. Before proceeding with the work of this Section, carefully check and verify all dimensions and sizes.

1.08 CUTTING AND PATCHING

A. Do all cutting, and patching required for installation of Work under this Contract. Patching is to match surrounding materials and finish.

B. Holes or notches shall not be cut in structural members without written consent of the Architect/District.

C. Arrange for and place all necessary sleeves or openings in the structure where allowed.

1.09 MATERIALS

A. All materials, appliances and equipment shall be new and the best of their respective kind, free from all defects and of the make, brand and quality specified or as accepted by the Engineer as herein provided. This shall apply to all parts of the work whether this particular paragraph is referred to by number.

B. Except as otherwise specified; all materials used in the fabrication and construction of the various parts of the equipment included in this work shall be in accordance with the latest standard specifications of the American Society for Testing Materials. All articles provided for the same general purpose or use shall be of the same make except as otherwise specified.

1.10 SHOP DRAWINGS

A. Submit electronic copies for all materials and equipment specified and listed which is proposed to install. These lists shall set forth the Specification section; manufacturer's name, model number, sizes, non-standard accessories specified, and such other information required to identify all items.

1.11. ALTERNATE EQUIPMENT

A. Prepare a base bid in complete accordance with these drawings and specifications.

B. Should contractor wish to submit alternate equipment he shall list such alternate and show for each alternate and show alternate the amount of cost to be deducted from, or added to, his bid price.

C. In all cases where substitutions are proposed, the contractor shall bear the cost of evaluation on the basis the standard hourly rate of engineering personnel involved.

1.12 CONFLICTS BETWEEN CONTRACT DOCUMENTS

A. In the event of conflicting requirements between items on the drawings, or between items in the specifications, or between items on the drawings and in the specifications, the more stringent or costly shall govern, unless decided otherwise by the Engineer, who shall be the sole judge in these matters.

1.13 CONFLICT IN SHOP DRAWINGS OR SUBMITTALS

A. Contractor agrees that shop drawing submittals processed by the Engineer do not become contract documents and are not change orders, that the purpose of the shop drawing review is to establish a reporting procedure and is intended for contractor's convenience in organizing his work and to permit the Engineer to monitor the contractor's progress and understanding of the design.

B. The process of review of the contractor's submittals is not the purpose of testing the Engineer's perception. If submittals and the contract documents are discovered either prior to or after the shop drawing submittals were processed by the Engineer, the contractor agrees that the contract documents shall control and shall be followed.

C. It is also the responsibility of the contractor to review the shop drawings or submittals to be submitted prior to submittal to the Engineer for his review. If shop drawings or submittals are received without the contractor's review stamp, the shop drawings or submittals will be returned to the contractor prior to the Engineer's review.

1.14 EXISTING UTILITY LINES

A. Location and character of principal existing utilities, including dimensions as shown on the Drawings, for convenience only, are believed complete and correct but shall be subject to field verification by the Contractor, as the District assumes no responsibility for their correctness.

B. Adjust location or alignment of the new work as necessary to avoid or to connect to existing utilities or piping without additional cost to the District.

C. Make arrangements and install extension of the existing gas, water, sewer and sewer. Provide connections. Verify before installation the invert elevations, locations, sizes and pressures of all existing utility lines at the new point of connections. Repair or replace all surfaces as required.

1.15 INTENT OF DRAWINGS

A. The drawings are essentially diagrammatic. The size and location of equipment and fixtures are drawn to scale wherever possible.

B. The Contract Drawings show the extent and general arrangement of the work covered under this section.

C. The work shall be followed as closely as possible; however, proper adjustments shall be made, with the District's concurrence to secure maximum headroom, a neat arrangement to keep passageways and openings clear, provide accessibility and provisions for maintenance, and meet all Code requirements, at no additional charges.

1.16 EXCAVATING, TRENCHING AND BACKFILLING

A. The mechanical work shall include all saw cutting, excavating, trenching, and backfilling required for the installation of piping, anchor blocks, and any other devices that are a part of this work.

B. Backfilling shall be performed in accordance with the applicable portions of other sections herein before.

C. Backfill shall not be placed until the mechanical work installed has been inspected, tested, and approved by the special inspector concerned.

1.17 CUTTING AND PATCHING

A. The Contractor shall do all drilling, cutting, and patching of the general construction work, rough, finish, and trim, which may be required for the installation of the work. All patching shall be of the same materials, workmanship, and finish as the original work, and shall accurately match the surrounding work. All cutting and patching shall be done under the Engineer's supervision.

1.18 QUALITY OF EQUIPMENT, MATERIALS AND WORKMANSHIP

A. Unless otherwise specified, all equipment and materials used in the installation shall be ASME, and IAPMO requirements. All workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed.

B. All materials and equipment shall be installed as recommended by the manufacturer.

1.19 ESCUTCHEON PLATES

A. Provide polished dull chrome-plated cast brass set screw flanges where pipes pass through walls, floors, ceilings, and partitions in exposed portions of the buildings. Escutcheon plates shall be provided in pipes at fixture and shall be polished chrome-plated. Steel escutcheon plates are not acceptable.

1.20 DAMAGE BY LEAKS

A. Contractor shall be responsible for all damage to any part of the premises caused by leaks or breaks in piping, equipment, or fixture furnished and/or installed by him, for a period of one year from the date of acceptance of the work by the District.

1.21 RECORD DRAWINGS

A. Keep an up-to-date, on the site accurate, dimensional reproducible set of record drawings, showing all work which is installed per contract drawings or differently from that shown on the contract drawings.

Record drawings shall include the location and the depth of buried or concealed piping, or equipment, etc.

B. Upon completion of the work, deliver the record drawings to the Engineer for final approval.

1.22 CLOSING-IN OF UNINSPECTED WORK:

A. Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the District's representative and IOR. Should any of his work be covered up or enclosed before such inspection and test, uncover the work at no expense to District and after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all his work and that of other trades to its original and proper condition.

1.23 PRELIMINARY OPERATION:

A. Should the District demand that any portion of the plant, apparatus, or equipment be operated for beneficial use prior to the final completion and acceptance of the work, the Contractor shall consent.

1.24 FINAL OPERATION

A. Upon completion of the installation of the equipment, the Contractor shall place a competent man in charge who shall operate the equipment, instructing the District's operators in all details of operation and maintenance of the equipment and controls for a period of 4 hours.

B. Provide copies of operation and maintenance manuals for each site shall be delivered to the District for approval prior to final completion of the project.

1.25 GUARANTEES:

A. As a condition precedent to the issuance of the final certificate for completion payment, the deliver to the District a special written guarantee. Guarantee all workmanship, equipment and materials for a period of one year from the date of acceptance of the installation. Be responsible for all damages to premises caused by leaks or breaks in piping during this period. Should any other defects occur during this period, promptly repair or replace the defective items as directed by the Engineer, free of charge to the District.

B. Warrant the complete and perfect operation of the entire system and that all apparatus will perform in accordance with the detailed drawings and Specifications.

C. Warrant that all equipment shall be supported in such a manner as to be free from objectionable vibration and noise.

D. Warrant that all licenses and royalties for use of any patented feature of the system will be paid before acceptance of the installation. Payment of such licenses and royalties shall be a part of the Contract.

1.26 SEISMIC RESTRAINT REQUIREMENTS:

A. Hangers for suspended equipment piping shall be sway braced in two directions, per "Guidelines for Seismic Restraints of Mechanical Equipment" by SMACNA.

B. All prefabricated equipment is to be designed and constructed in such a manner that all portions, elements, subassemblies, and/or parts of said equipment and the equipment as a whole, including its

attachments, will resist a horizontal and vertical load equal to the operating weights of those parts multiplied by the factors indicated on the plumbing drawings.

C. Load is to be applied at the center of gravity of the part and to be in any direction horizontally and vertically. Anchorage, support, and/or attachment of said prefabricated equipment to the structure shall be in accordance with "Guidelines for Seismic restraints of Mechanical Equipment" by SMACNA.

D. Submit shop drawings and calculations for seismic restraints and anchorage of the equipment to the Engineer and Structural Engineer for review and approval. Installation of equipment or supporting elements shall not begin until shop drawings are approved by the Engineer and District's representative.

E. Refer to seismic notes on plumbing plans.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials shall be new and in perfect condition; all materials for similar uses shall be of the same type, material, and manufacture for ease of future maintenance.

B. Accessibility: All equipment shall be readily accessible for maintenance and repairs. Provide all necessary staging, scaffolding, ladders, or similar facilities necessary to install work.

C. Exposed Trim: All trim, piping, and fittings allowed to remain exposed in finished parts of the building shall be chromium-plated brass, or rough piping may be covered with chromium-plated brass tubing.

D. Protection: All Materials, fixtures, and equipment shall be covered or sealed upon installation so as to be provide for safety and to ensure that operation and appearance will be maintained after subsequent construction operation.

2.02 COOPERATION WITH OTHERS

A. Organize the work so that progress will harmonize with the work of all trades, so that all work may proceed as expeditiously as possible.

B. Be responsible for the correct placing of the work and the connection thereof to the work of all related trades.

2.03 PIPING

A. Soil, waste and vent piping, underground inside of buildings and to points 5 feet outside of building, shall be coated, cast iron hub less soil pipes and fittings with Anaco-Husky SD4000 heavy-duty stainless-steel couplings with stainless steel bolts.

B. Soil and waste drain piping inside of building, above ground, shall be No-Hub joint soil pipe No.CISPI-301-78, with stainless steel couplings per CISPI-310-78, cast iron No-Hub joint soil pipe No.CISPI-301-78 with stainless steel couplings per CISPI-310-78.

C. Domestic cold and hot water piping inside the building above ground shall be type "L" drawn temper copper tubing ASTM B88 with wrought copper fittings and solder joints. Hot water piping shall be insulated. All domestic water pipes, fittings and valves shall be lead-free.

D. Domestic cold and hot water piping inside the building below ground shall be type "K" hard drawn copper tubing ASTM B88 with wrought copper fittings and solder joints. Hot water piping shall be insulated. All domestic water pipes, fittings and valves shall be lead-free.

E Condensate drain piping for air conditioning units to point of discharge shall be Type "L" copper tubing and wrought copper fittings. Condensate piping in ceiling space below roof and in walls shall be insulated with Owens-Corning Fiber glass 25. Pipe insulation; completely fire safe FRJ jacket with self-sealing lap and with end joint butt strips or approved equal by Johns-Manville.

E. Natural gas piping shall be black steel ASTM A53 schedule 40 type S, with 150# black banded malleable iron screwed fittings and couplings. Exterior exposed gas piping shall be epoxy coated for corrosion protection.

2.04 PIPE CONNECTIONS:

A. All connections between 85% red brass pipe, type "K", “L” or type "M" copper tubing and steel pipe shall be made with Maloney, or approved equal, dielectric unions or flanges, which will prevent the flow of electrical current from one type of metal to another.

B. Sleeves shall be fire rated (3-hour fire resistance) Pyro Pac rubber link seal sleeve series L.S. with galvanized link-seal sleeve series W.S., complete for fire rated wall or floors. Use standard link seal sleeves and rubber link seals for non-rated wall.

2.05 VALVES:

A. All valves shall be manufactured by Nibco, Milwaukee, ITT, Grinnell or Lunkenheimer, gate type, unless otherwise noted. All valves of the same type shall be of the same make. Valves shall be line size and shall be solder joint type for copper tubing.

B. Unions in copper pipings,2 1/2 inches and smaller shall be Nibco, #733, or approved equal, 2 inches and larger shall be Nibco #740. For steel piping: Crane No. 300 AAR, galvanized malleable iron, ground joint, brass-to-iron seat.

C. Drop ear elbows, 90 degrees, shall be Nibco No.707-5, copper-to-copper or Nibco No. 707-3-5, copper to FSPS, for use at counter and wall trim connection.

D. Use stainless steel ball valves for isolating shut-off valves whenever possible.

NOTE: Check valves installed in vertical piping and in discharge piping from pumps shall be non-slam check valves, Miller No. 162 or Stockham No. WG-970 or approved equal.

2.06 ROOF FLASHING:

A. Flash all vents and other piping stubbed up through roof with a waterproof flashing constructed of 18-gauge galvanized sheet metal or aluminum not less than .040 inches thick. Extend base of flashing on the roof not less than 18 inches from the pipe. Extend flashing up the pipe not less than 6 inches and in contact with the pipe for 1 inch at top.

2.07 PIPE ISOLATORS:

A. Isolate all pipe hangers or piping supports from hot and cold-water piping with "ACOUSTO PLUM" system, Semco Series 100 for IPS piping, and series 500 for tubing, or Potter-Roemer PR- Isolators, Series 100 for IPS piping, and Series 300 for tubing. Where pipes pass through openings or touch any part of the structure, wrap with 1/4-inch-thick waterproofed felt wrap.

2.08 INSULATION:

A. All hot water supply and return piping 1" and smaller shall be insulated with 1" of glass fiber pipe insulation with factory applied white jacket, as per Manville "Micro-Lok 850 AP" or equal by Owens-Corning. Insulate fittings, flanges and valves with pre-molded one-piece P.V.C. molded fitting covers with factory matched pre-cut insulation inserts as per Manville "Zeston". Insulation shall meet the flame spread and smoke density ratings as per Uniform Mechanical code Section 2187-(8) for flame spread and smoke density of not more than 25/50 fire hazard classification and shall meet ASTM E-84, NFPA-255 and UL-730 requirements.

2.09 CLEANOUTS:

A. Provide and install cleanouts where indicated on drawings and at all bends, angles, upper terminals, and not over 100-foot intervals in any horizontal piping, as required by the local Plumbing Code.

B. All cleanouts shall have extra heavy cast iron body and extra heavy bronze plug. All flush with floor cleanouts shall have adjustable watertight covers. When waterproofing membrane is used, the cleanout body shall have integral anchoring flange and heavy clamping collar. All cleanouts shall be as follows:

1. INTERIOR FINISHED ROOM FLOORS: Cleanouts to have nonskid nickel-bronze top, and be Smith No. 4043, Josam No. 58350, Zurn No. Zn-1324, or approved equal.

2. INTERIOR FINISHED ROOM WALLS: Cleanouts shall have bonderized prime coated steel cover, and be Smith No. 4532 P.C., Josam No. YL-1590-B, Zurn No. Z-1320, Wade No. W-8460-R or approved equal. Install 26-gauge galvanized sleeve from tee through opening to finished wall surface.

3. Exposed cast iron lines, above ground, wall, shall be Smith No.4405, Josam No. Y-30, Zurn No. Z-1305, Wade W-8550-R or approved equal.

4. Interior finished room floors shall have nickel bronze top, Smith No. 4043, Josam No. Y-670-FB, Wade No. W-7000 Series Zurn No. ZN-1400-2, or approved equal.

2.10 PIPE HANGERS AND SUPPORTS:

A. Tolco, Michigan Co., or approved equal. Provide lateral bracing where hangers exceed 18 inches long. Isolate hangers and supports from water piping with Semco Trisolators. Insulate at openings, of structure with 1/2 inch felt wrap.

2.11 PIPING IDENTIFICATION:

A. Secure "Brady" pipe identification system at eight feet on center, classifying the material carried, to each pipeline. All line valve shall be identified with "Brady" valve tags.

2.12 ACCESS DOORS, BOXES AND COVERS:

A. Provide and install where indicated on-drawings and adjacent to all concealed valves and equipment requiring service. Doors shall be metal hinged, adequately sized, and fire rated to match construction. Minimum access door size shall be 12” x 12”.

2.13 PLUMBING FIXTURES REQUIREMENTS:

A. Verify all fixture and equipment locations with the Architectural plans and shall furnish and connect all fixtures and equipment shown thereon.

2.14 PLUMBING FIXTURE:

A. Refer to Plumbing Fixture Schedule on Drawings.
B. Protective Shielding Pipe Covers: All accessible lavatories and sinks shall be provided with protective shielding pipe covers. Provide product by Truebro, Inc. or equal. Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.01 WORKMANSHIP:

A. All workmanship shall be performed by-skilled mechanics using the best standard practices of the trade.

3.02 GENERAL PIPING INSTALLATION:

A. Thoroughly clean all piping before installation. Cap all openings during construction.

B. All above ground piping shall be concealed wherever possible. Underground piping shall have a minimum cover of 24 inches.

C. Provide a union on one side of all valves at equipment connections and in other locations as required for ease of servicing of equipment.

D. Make suitable provisions for maximum expansion and contraction of piping. Provide swing joints and anchors as necessary.

E. No bullhead tees, close nipples, or bushings will be allowed in piping.

F. All connections between 85% red brass, type "K” underground or type "L" copper tubing and steel pipe, shall be made with dielectric unions or flanges which will prevent the flow of electrical current from one type of metal to another.

G. Arrange piping to maintain headroom and keep passageways and access openings clear and offset as required to coincide with structural features of building. Do not spring, bend, or force pipe into place. Use fittings for all offset or changes in alignment of piping. Except for water piping below floor, use long sweep bends. Run piping to drain at low points, free of traps, sags, and bends. Provide ample space between pipes for proper thickness of covering.

H. Horizontal sanitary and storm drain piping shall be installed to a uniform grade of not less than 1/4 inch per foot, unless shown or directed otherwise. Vent piping shall be installed to provide proper ventilation of the plumbing and graded to provide for its drainage. Buried sewer, waste, and storm drain piping shall be continuously supported along the full length of the pipe.

I. Openings in pipes, drains, fittings, apparatus, and equipment shall be kept covered or plugged to prevent accumulating obstructions in the piping.

J. Water piping shall be run free of traps, sags, and bends, and graded and valved to provide for the complete drainage and control of the system.

K. All threaded piping shall be made up with an approved pipe dope, applied to male thread only, covering the entire thread.

L. At all exterior locations, install all yard boxes, and clean out to grade in the center of a concrete collar surrounding the yard box or clean out. The collar shall be full depth and a minimum 3" wide around the object but a minimum size of 12" x 12" x 12" deep. The concrete collar shall be square with the building, level and true with grade.

3.03 PLUMBING FIXTURE INSTALLATION:

A. Traps and trap arms shall be set at right angles to walls, in line with fixture outlets, without any offsets, angles, or bends Fixture connections shall be properly aligned to prevent any undue strain on equipment or fixture.

B. Each fixture shall be set level and in continues contract with floor or wall.

C. Exposed plated, polished, or enameled connections from fixtures shall be put up with special care showing no tool marks or threads.

D. Trap installations, exposed above the floor, shall have chromium-plated brass escutcheon plates, casings, and uniform code pattern traps.

E. Trim shall be polished chromium-plated brass, by the same manufacture for each type. Where stop valves are required in exposed piping, they shall be short stem polished chromium-plated type. Flush valves shall all be by the same manufacture.

F. Plumbing fixtures, equipment, faucets, and trim shall be identical in each category.

G. All fixtures installed in floors with waterproof membranes shall be provided with approved membrane clamps.

3.04 VENT PIPING AND FLASHINGS:

A. Sanitary plumbing vents shall terminate 12 inches above the roof and be flashed as per specification under Roof Flashing.

B. Tops of flashing shall be sealed, and counter flashed.

3.05 VALVES:

A. Valves shall be arranged and located to give complete control of all apparatus and plumbing fixtures, and as indicated, to isolate batteries of fixtures or sections of water systems. All valves shall be easily accessible.

B. In no case will exposed valves be allowed in finished portions of buildings. Provide access plates over valves in finished walls and valve boxes for valves in ground outside of building.

3.06 EXPANSION:

A. Expansion of piping shall be provided for by swings, offsets, and anchors where required for a satisfactory installation. Anchors shall be constructed of structural shapes of sufficient strength for purpose intended.

3.07 ACCESS DOORS:

A. Access openings for valves and cleanouts shall be fitted with not less than 18-gauge metal frames, 16-gauge doors with concealed hinges, locks operated with Allen head wrench, and anchor straps. Access doors shall be prime coated for painted walls, and polished chromium for tile walls, Karp # 214-P-AKL, 12" x 12", or approved equal.

B. Each access door shall be securely fastened into place and protected from construction damage.

3.08 HANGERS AND SUPPORTS:

A. Piping shall be firmly held in place by adjustable split ring malleable iron hangers, supports and pipe rests, located adjacent to fittings, at each offset or change of direction, at the ends of branch over 5 feet long, at riser pipes, and along piping where necessary to prevent sags, bends, or vibrations.

B. Maximum spacing for supports of horizontal piping shall be as follows:

steel or brass pipe: 1 1/4-inch or large, 10 feet
steel or brass pipe: 1-inch, 8-feet
steel or brass pipe: 3/4-inch, 6 feet
copper tubing: 1 1/4-inch, 8 feet
copper tubing: 1-inch or smaller, 6 feet

C. Hanger rods shall be solid mild steel in accordance with the following schedule:

2 inches and smaller: 3/8-inch diameter rod
2 1/2 inches to 3 1/4 inches: 1/2-inch diameter rod
4 inches to 5 inches: 5/8-inch diameter rod

D. Piping on roofs shall be supported and secured on redwood blocks anchored to roof and set in mastic.

3.09 UNION, FLANGES, AND PIPING CONNECTIONS:

A. Connections between copper tubing and valves, 2 inches and smaller, shall be made with brass, copper tubing to pipe threaded adapters. Connections between copper tubing and other types of piping having threaded openings shall be made with fitting adapters.

B. Provide dielectric couplings or unions at points where copper tubing or piping joins steel piping, or equipment made of a material containing iron.

C. Unions are required on the inlet and outlet sides of all apparatus or equipment having screwed connections, 2 inches and smaller and also on the outlet side of all screwed valves, 2 inches and smaller, to facilitate easy removal for repair and replacement.

D. Unions are not required where valves are underground or are accessible only through hand size access plates.

E. Connections between copper tubing and other types of piping having threaded openings shall be made of brass, copper, to IPS ground joint unions.

3.10 TESTING AND ADJUSTING OF PLUMBING EQUIPMENT:

A. No piping work, fixtures, or equipment shall be concealed or covered until they have been inspected and approved by the Mechanical Engineer who shall be notified by the contractor when the work is ready for inspection.

B. Should any work be enclosed or covered up before such inspection and test, the contractor shall, at his own expense, uncover the work, and after it has been inspected, tested and approved, make all repairs with such materials as may be necessary to restore all his work and that of other sections to their original and proper conditions.

C. All work shall be completely installed, tested as required by this section and the local ordinances, and shall be leak tight before inspection is requested. All test shall be repeated to the satisfaction of those making the inspection.

D. Plumbing fixtures shall be filled with water and checked for leaks or retarded flow.

E. Each piece of plumbing equipment and the entire plumbing system shall be adjusted and readjusted as required to ensure proper functioning and left in first-class operating condition.

F. After soil, waste and storm pipe have been tested at the cleanout plugs shall be removed, heavily flushed with graphite impregnated grease, replaced, and screwed up snugly. Nylon plugs shall not be coated.

J. All soil, waste, storm drain, and vent piping shall be filled with water to the highest point in each system with all air removed. The lines shall be flushed by removing the test plug. Piping may be tested in sections, providing all portions to be concealed shall be subjected to not less than a 10-foot head. Standpipe installed for head test shall be 1-inch minimum diameter.

K. Sewer and storm drain piping shall be filled with water to its highest point, but at not less than 5 PSIG pressure.

L. All test shall be maintained without leaks or pressure loss for not less than six hours, with allowance for temperature changes, except for transit pipe.

END OF SECTION

SECTION 26 05 50
BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Conduit

B. Fittings and Conduit Bodies

C. Surface Raceways

D. 600 Volt Wires

E. Boxes

F. Wiring Devices

G. Cabinets and Enclosures

1.02 RELATED SECTIONS

A. Section 26 50 10 - Electrical General Requirements, applies to this section, with the additions and modifications specified herein.

B. Section 26 05 26 - Grounding and Bonding.

C. Section 26 05 53 - Electrical Identification

1.03 APPLICABLE PUBLICATIONS

The following publications form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American National Standards Institute, Inc. (ANSI) Publications

1. C80.1-2005 Rigid Steel Conduit, Zinc Coated
2. C80.3-2005 Electrical Metallic Tubing, Zinc Coated
3. FB 1-2007 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
4. OS 1-2008 Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports
5. OS 2- 2008 Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports

B. National Electrical Manufacturers Association (NEMA) Publications:

1. ABI Molded Case Circuit Breakers
2. ICS6-2011 Industrial Controls and Systems Enclosures
3. KS 1-2001 Enclosed Switches
4. TC 2- 2003 Electrical Plastic Tubing (EPT) and Conduit (EPC-40) and (EPC-80)
5. WD 1-2005 General Requirements for Wiring Devices
6. WD 6-1997 Wiring Device Dimensional Requirements

C. National Fire Protection Association (NFPA) Publication:

1. 2016 California Electrical Code.

D. Underwriters Laboratories, Inc. (U.L.) Publications:

1. 1-2005 Standard for Flexible Metal Conduit
2. 5- 2011 Standard for Surface Metal Raceways and Fittings
3. 5A -2003 Non-Metallic Surface raceways and fittings
4. 5C -2004 Standard for Surface raceways and Fittings for use with Data, signal, and Control circuits
5. 6-2007 Rigid Metallic Conduit
6. 50-95 Cabinet and Boxes
7. 83-2008 Thermoplastic Insulated Wires
8. 198E-88 Class R Fuses
9. 360-2009 Liquid-tight Flexible Steel Conduit
10. 486A- 486B 2003 Wire Connectors and Soldering Lugs, for use with Copper Conductors
11. 498-96 2001 Attachment Plugs and Receptacles
12. 508-99 Industrial Control Equipment
13. 510-2005 Insulating Tape
14. 514A-2004 Metallic Outlet Boxes
15. 514B-2004 Fittings for Conduit and Outlet Box
16. 0651-2011 Schedule for 40 & 80 Rigid PVC Conduit
17. 797-2007 Electrical Metallic Tubing
18. 1242-2006 Standard for Intermediate Metal Conduit

E. State of California Administrative Codes:

1. Title 24, Part 2, Chapter 2-53, 2016 Energy Conservation Standards

1.04 SUBMITTALS

A. Submit under provisions of Division 26 and Division -1.

B. Product Data: Provide for:

1. Conduit (all types)
2. 600 Volt Wires (aerial quadruplex & Triplex Aluminum cables)
3. Receptacles (all types)
4. Surface Raceways
5. Cabinets and Enclosures

C. Test Reports: Provide for:

1. Insulation resistance tests of low voltage conductors.
2. Operational tests.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division - 1.

B. Accurately record actual routing of conduits larger than 2 inches and cable trays.

C. Accurately record actual locations and mounting heights of outlet, pull and junction boxes.

D. Accurately record actual location of each new receptacle.

1.06 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70 and with all state adopted amendments, except where requirements herein are more stringent.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.07 QUALITY ASSURANCE

In each standard referenced to herein, consider the advisory provisions to be mandatory, as though the word "shall" have been substituted for "should" wherever it appears. Interpret references in these standards to "authority having jurisdiction," or other words of similar meaning, to mean District.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle Products to site under provisions of Section 16010.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.09 PROJECT CONDITIONS

A. The drawings are diagrammatic and shall not be scaled for exact locations: Field conditions and non-interference with other utilities and trades, shall determine exact locations.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

Materials and equipment shall conform to the respective specifications and standards and to the specifications herein. Electrical ratings shall be as indicated. Except where specifically indicated otherwise, provide only new materials having all legally required approvals and/or labels. Items of a similar nature shall be of the same type and manufacturer.

2.02 CONDUIT

A. Rigid Steel Conduit (Zinc-coated): ANSI C80.1, UL 6, hot-dip galvanized, threaded type.

B. Intermediate Metal Conduit: UL 1242, zinc coated steel only.

C. Electrical Metallic Tubing: UL 797, ANSI C80.3.

D. Flexible Metal Conduit: UL 1.

E. Liquid tight Flexible Metallic Conduit: UL 360, Interlocked steel construction with a polyurethane jacket, Electri-Flex Liquatite® type CEA or approved equal.

2.03 FITTINGS

A. Fittings for Rigid Metallic Conduit and Intermediate Metallic Conduit: UL 514B, threaded type.

B. Fittings for EMT: Compression type. Split/set screw couplings unacceptable.

C. Fittings for Flexible Metal Conduit: ANSI/NEMA FB 1.

D. Expansion/Deflection Fittings: Provide fitting capable of a straight-line expansion movement of 2" in either direction and a movement of 3/4" from the normal in all other directions, OZ Gedney Type AX DX. Provide complete with grounding and bonding jumpers.

2.04 SURFACE RACEWAYS

Provide as indicated on the drawings. Surface mounted raceways in all classroom and office environments shall be Wiremold 5500 series as shown on drawings.

2.05 CONDUCTORS

Conductors shall bear the date of manufacture imprinted on the insulation with other identification. Wire and cable manufactured more than 6 months before delivery to the job site shall not be used.

A. 600 Volt Wires and Cables: UL 83. Conductors shall be stranded copper. Insulation shall be type THHN/THWN unless otherwise noted.

B. Color Coding: Color shall be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in same raceway or box, other neutral shall be white with colored (not green) stripe. Color of ungrounded conductors in different voltage systems shall be as follows:

208Y/120 volt, 3Ø:
1. Phase A - black
2. Phase B - red
3. Phase C - blue.

C. Minimum size for branch circuits shall be No. 12 AWG, THHN/THWN copper unless otherwise noted.

2.06 OUTLET BOXES

A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel.

B. Cast Boxes: NEMA FB 1, Type FD, cast ferroalloy. Provide gasketed cover and threaded hubs by box manufacturer.

2.07 RECEPTACLES: UL 498 and NEMA WD 1

A. Receptacles shall be NEMA 5-20R unless otherwise indicated on the drawings. Acceptable manufacturers: Hubbell, Pass & Seymour, Leviton or approved equal.

B. Weatherproof Receptacles: For flush mounted weatherproof convenience outlets, provide duplex receptacles as listed above with gasketed stainless steel cover plate and gasketed cap over each receptacle opening, Sierra WP series. Where surface mounted, use cast box with gasketed cast aluminum plate having duplex lift covers, Hubbell No. 5206. Receptacles shall be UL listed for use in "wet locations."

C. All receptacles located in mechanical rooms, electrical rooms, and on exterior of building shall be GFCI type. In addition to this requirement, provide GFCI type receptacles where indicated on the drawings.

2.08 SWITCHES: NEMA WD 1

A. General Purpose wall switches shall be heavy-duty, 20A, 277V AC, general use snap switch with ivory handle. Provide single pole, 2-pole, 3-way, 4-way, momentary contact, weather-proof, lock or other type switches indicated. Acceptable manufacturers: Hubbell, Pass & Seymour, Leviton or approved equal.

2.09 DEVICE PLATES

A. Provide UL listed, one-piece device plates for all wiring devices, for telephone and computer outlets and for outlet boxes used as junction or pull boxes. For metal outlets and fittings, plates shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates installed in wet locations shall be gasketed and UL listed for "wet locations."

B. Provide 3/16" high block letters, black enamel filled machine engraving for new device plates under any of the following conditions listed below. Use designations indicated or select words to best describe purpose of each device.

1. All receptacle device plates.
2. Plates containing more than three switch devices.
3. Plates for switches controlling loads, where such loads are not visible from the switch location.
4. Selector switches.
5. Manual motor starting switches.
6. Special outlets where indicated.
7. Control switches.

2.10 CABINETS: UL 50.

A. Cabinets for same type of use shall be the product of a single manufacturer.

B. Construct of cold-rolled drawing quality steel, with metal gages and construction methods conforming to National Electrical Code requirements, and Underwriters Laboratories' standards. Provide 12-gauge G-90 grade galvanized steel minimum, unless otherwise noted.

C. Finish doors, trims, and back boxes for surface-mounted cabinets in finished areas by applying a rust-resistant treatment, prime coat, and a final coat of manufacturer’s standard enamel or lacquer finish. Galvanize all other sheet metal components of cabinets including back boxes for flush cabinets, excepting non-ferrous metal parts, or steel parts provided with cadmium plating or equivalent protective plating.

D. Equip doors with concealed or semi-concealed hinges and with flush or semi-flush spring catch type flush cylinder locks. Key cabinet doors of similar use alike and provide two keys with each lock.

E. Equip cabinets for use with telephone, alarm or signal systems with a 0.5" thick plywood backboard. Equip cabinets with terminal strips where so specified. Equip cabinets with nameplates.

F. Surface cabinets shall be furnished without knockouts. Punch or drill required openings during installation. Equip flush back boxes with manufacturer's standard pattern of knockouts.

G. Equip cabinet doors exceeding 40" in height with vertical bolt three point locking mechanisms.

H. Acceptable manufacturers: Products from (or approved equal) to the following manufacturers are acceptable.

1. Cabinets for general use: Hoffman Engineering Co., Square D, or Columbia Manufacturing Co.
2. Cabinets for systems and/or products, use cabinets furnished by manufacturer with system or product. Where system or product cabinets do not comply with these Specifications, submit cabinet shop drawings, indicating deviations, and obtain approval for their use.

2.11 JUNCTION BOXES AND PULL BOXES: UL 50

A. Provide pull and junction boxes of Code gauge steel sized as indicated or required. Provide 16-gauge steel minimum, unless otherwise noted. Indoor enclosures shall conform to NEMA ICS 6 for the type 1, unless otherwise noted.

B. Size junction and pull boxes to not less than minimum Code requirements. Increase size above Code requirements where necessary to provide space for pulling, racking or splicing enclosed conductors, or where specified or indicated dimensions exceed Code requirements.

C. Fabricate sheet metal junction and pull boxes of galvanized, Code gage, sheet steel. Include angle iron framing where required for rigidity. Boxes shall not deflect or deform visibly when covers are removed after conduit and conductors are installed, and any deflection occurring shall not prevent the easy installation and removal of cover attachment screws.

D. Do not use single covers for junction and pull boxes having cover length or width dimension exceeding three feet unless so specified, indicated, or approved. Sectionalize covers that exceed three feet in either dimension into two or more sections.

E. For interior junction and pull boxes located in concrete floors, and 24" square or smaller, use cast iron boxes with integral cast tapped conduit hubs, and having recessed cover flush in the box trim placing all elements of the face of the box flush in the plane of the surrounding floor. Equip boxes with watertight covers where so indicated.

F. Interior ceiling mounted pull boxers shall be a minimum 24” x 24” x 6” opening downward into room area and construction to receive the minimum number of conduit plus 50 percent.

G. Equip surface sheet metal junction and pull boxes with covers aligning with the sides of the boxes and equip flush boxes with covers extending 3/4" all around the perimeter of the back box. Provide sufficient cover attachment screws to ensure that box covers will contact the surface of the box for the entire perimeter of the enclosure. Use 316 stainless steel fasteners to attach covers to boxes.

H. Use brass screws to attach junction and pull box covers to interior floor boxes or to boxes located where moisture may be present.

I. Acceptable manufacturers:

1. Sheet steel junction and pull boxes: Columbia Electric Co., Hoffman Engineering Co., Pico Metal Products Co.

2.12 WIRE CONNECTORS AND TERMINALS: For use with copper conductors. UL 486A.

2.13 INSULATING TAPES: UL 510.

NAMEPLATES: Provide as specified in Section 26 05 53, "Electrical Identification."

PART 3 - EXECUTION

3.01 INSTALLATION: Electrical installation shall conform to requirements of CEC 2016, and to requirements specified herein.

3.02 LOCATIONS

A. The drawings indicate diagrammatically the desired locations and arrangements of the components of the electrical work. Follow the drawings as closely as possible but use judgment and coordinate with other trades to secure the best possible installation in the available space and under the developed conditions.

B. Before installing any equipment, conduit, or locating any outlet, examine the complete set of documents, including shop drawings and specifications, and verify all dimensions and space requirements. Make such minor adjustments as may be necessary to fit the building structure and accommodate the work of other trades. Install all electrical work to preserve legal headroom, access, workspace, clearances and to keep openings and passage ways clear. Arrange for additional space if required for the servicing, maintenance, and replacement of the electrical equipment.

C. Control devices shall not be mounted more than 6'-6" above the floor.

D. Prior to installation, the District reserves the right to relocate any outlet or device within six feet of the location indicated on the plans and at no additional cost to the District.

E. No additional compensation will be allowed for omissions, inadequate space, misunderstandings or rejected work caused by neglect of these requirements.

3.03 CONDUIT

A. Rigid steel conduit may be used in all locations. Rigid steel conduit shall not be installed below grade in direct contact with earth; it shall be encased in 3" concrete envelope or wrap conduits with double layer of 10 mil black tape.

B. Intermediate metal conduit (IMC) may be used in lieu of rigid steel conduit where permitted by Code.

C. Aluminum Conduit: Use not permitted.

D. Electrical metallic tubing (EMT) may be installed for feeder and branch circuit wiring at indoor dry locations only. Restrictions applicable to EMT:

1. Do not use in feeder circuits (building exterior)
2. Do not install below grade.
3. Do not encase in concrete.
4. Do not use in areas subject to physical damage (including, but not limited to, mechanical equipment rooms and electrical equipment rooms).
5. Do not use in hazardous areas.
6. Do not use outdoors.

E. Use flexible metallic conduit in short lengths for final connections or between portables to in accessible ceilings spaces, or with the approval of the Architect, where absolutely necessary due to structural conditions. Use liquid tight flexible metal conduit where flexible conduit is exposed to weather, oil or moisture. Provide green ground conductor in all flexible conduit.

F. Install conduit in accordance with NECA "Standard of Installation." The electrical drawings are diagrammatic and do not show all offsets, bends, fittings, junction boxes, pull boxes and expansion fittings required to meet field conditions. Determine actual material and hardware requirements and verify all dimensions by field inspection.

G. Arrange supports to prevent misalignment during wiring installation.

H. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

I. Group related conduits; support using conduit rack. Construct rack using steel channel provide space on each for 25 percent additional conduits.

J. Arrange conduit to maintain headroom and present neat appearance.

K. Route exposed conduit parallel and perpendicular to walls.

L. Maintain adequate clearance between conduit and piping.

M. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104 degrees.

N. Cut conduit square using saw or pipe cutter; de-burr cut ends.

O. Bring conduit to shoulder of fittings; fasten securely.

P. Provide pull fittings in all overhead conduit runs exceeding 200 feet of straight conduit or having more than the equivalent of three 90-degree bends. Each 90-degree bend shall be considered the equivalent of 50 feet of straight run. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2-inch size.

Q. Where conduit passes from one type of construction to another, or where there is a possibility of dissimilar movements, an expansion/deflection device or a suitable loop of seal tight flexible conduit shall be installed. Looped seal tight flexible conduit shall consist of 18" minimum length of looped conduit with a junction box at one or both ends, wherever conduit crosses building seismic joints.

R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

S. Provide 1/8" diameter polyethylene pull line in each new empty conduit except sleeves and nipples.

T. Conduit which penetrates fire walls, fire partitions, or floors shall be metallic on both sides of fire walls, fire partitions, or floors for minimum distance of 6 inches. Restore fire rating integrity at conduit penetration. All holes created to extend electrical systems through fire rated floors and walls shall be sealed by the electrical contractor with an intumescent material capable of expanding up to 8 to 10 times when exposed to temperatures beginning at 250°F. It shall be UL Classified and have I.C.B.O., B.O.C.A.I. and S.B.C.C.I. (NRB 243) approved ratings to three hours per ASTM E-814 (UL 1479).

U. Acceptable Manufacturers: 3M, Carborundum, Hevi-Duty/Nelson, or approved equal.

V. Where conductors of No. 4 AWG or larger are to be installed in a conduit, or where any conductors are to be deflected more than 30 degrees when leaving a conduit, terminate the conduit with an insulating bushing.

W. Ground and bond conduit under provisions of Section 26 05 26

3.04 600 VOLT CONDUCTORS

A. Splices:

1. Splices in conductors #8 AWG and smaller shall be made with "Scotchlok" insulated connectors or equal of proper size for conductors being spliced.
2. Splices in conductors #6 AWG and larger shall be made with pressure type solder less connectors. The splice area shall be taped to provide equal or greater insulation than the original. Tape run-back over the original insulation shall extend 3 to 5 overall diameters of the insulated wire.

B. Conductors and terminal lugs shall be used for terminating stranded conductors #6 AWG and larger and shall be T&B, Iscor, or approved equal solder less connectors.

C. Wire in panels, cabinets, pull boxes and wiring gutters shall be neatly grouped, strapped together with T&B Model Tyrap cable strap or laced with #12 stranded lacing twine and fanned out to the terminals.

D. Neutral conductor shall be continuous in outlet boxes and shall not be broken by addition or removal of devices.

E. Wiring methods in return air plenum spaces shall comply with NEC 300-22.

3.05 FITTINGS

A. Use threaded fittings for rigid metal conduit and compression fittings for EMT tubing.

B. Use cement-on fittings for plastic conduit and tapered drive-on fittings for fiber conduit.

C. Fittings for flexible conduit shall be of the thread less hinged clamp type. Do not use fittings threaded internally into the flexible conduit ends.

D. Use fittings made of the same material as the raceway except:

1. Malleable iron and steel are interchangeable.
2. Die cast fittings may be used for flexible steel conduit and for factory manufactured offsets.
3. Use plastic insulated bushings for conduit sizes larger than 1".
4. Use insulated throat connectors for electrical metallic tubing.

3.06 CABINETS

A. Set cabinets at heights indicated or specified. In the absence of such information, set cabinets at not to exceed 6'-6" from finish floor to top of cabinet.

B. Align tops of cabinets in sight of each other at a uniform height.

C. Install cabinets and other enclosure products in plumb with the building construction. Install flush enclosures so that the trim will rest against the surrounding surface material around the entire perimeter of the enclosure.

D. Do not locate cabinets (or other electrical enclosures) where room doors will touch enclosure face when room door is opened 180°. Locate cabinets (and other enclosures) so that enclosure door can be opened through a minimum 180° arc, except that the arc may be reduced to 130° for enclosures mounted to wireways. Do not install surface mounted cabinets in finished areas, unless so indicated. Where conflicting data is indicated, verify mounting requirements prior to ordering cabinets.

3.07 WIRING DEVICES

A. Use products of a single manufacturer for each type of wiring device. Different manufacturers may be used for different type devices, if the requirements of the specification are fulfilled.

B. Use the products of a single manufacturer for all device plates. Obtain prior approval for any variations from this requirement except that plate variations are allowed for the following devices:

1. Where the selected plate manufacturer does not manufacture a suitable finish plate.
2. For heavy-duty receptacles rated at more than 30 amperes.
3. Where the raceway system enclosure employs a non-standard finish plate.
4. Where non-standard plates are specified or indicated.

C. Where pilot lights are indicated, use incandescent lamp and jewel type lens mounted in the same outlet as the switch, with common finish plate. Pilot lights shall be "on" when controlled load is "on".

D. Substitute key operations for toggle where locking switches are provided. Provide not less than two keys for each such switch, except not more than ten keys of the same pattern for the total project. Use only keys that are compatible with key system established for site.

E. Position receptacles so that the ground contact in grounding type receptacles is on bottom of parallel prongs.

F. Install adjacent devices of the same type and with the same mounting height in a common outlet box.

G. Prior to installation of switch outlets, examine architectural plans and verify locations. Place switches in the wall at the latch side of the door.

H. Connect three phase receptacles to establish clockwise phase rotation, viewing face of receptacle. Terminate phase conductor at same terminals on all such receptacles.

I. Coordinate the electrical work with the work of other trades to ensure that wiring device flush outlets are positioned with box openings aligned with the face of the surrounding finish material. Pay special attention to installations in cabinet work, and in connection with specialty building equipment requiring very exact electrical rough-in.

3.08 BOXES, OUTLETS AND SUPPORTS:

Provide boxes in wiring or raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways shall be cast-metal, hub-type when located in wet locations, when surface mounted on outside of exterior surfaces, when installed exposed up to 7 feet above interior floors, when installed under raised floor or when installed in hazardous areas. Boxes in other areas shall be sheet steel. Each box shall have volume required by NFPA 70 for number of conductors enclosed in the box. Provide gaskets for cast-metal boxes installed in wet locations.

3.09 JUNCTION AND PULL BOXES

A. Wherever possible use outlet boxes for junction and pull boxes.

B. Locate interior junction and pull boxes in machine rooms, equipment rooms, storage rooms, electrical rooms and similar utility spaces unless otherwise indicated or approved. Where junction or pull boxes must be used in finished areas, use flush boxes only equipped with prime finished sheet metal plates. Fasten plates to boxes with countersunk flat head screws. Provide plates with 3/4" trim all around.

C. Do not use sectionalized boxes except where indicated. Do not mix feeder and branch circuit conductors in a common pull or junction box.

D. Where several feeders pass through common pull box, tag feeders to indicate circuit number and panel designation.

3.10 OPENINGS, CHASES AND SLEEVES

A. Provide openings, chases, cutting, patching, sleeves and other products, necessary to permit the electrical raceways and cables to pass through the structure.

B. Establish locations for openings, chases and sleeves sufficiently in advance of construction to avoid cutting and patching. Perform any required cutting and patching for electrical work and obtain approval for cutting from Architect prior to work being done.

C. Repair damages to finished work and surfaces caused by cutting, to the satisfaction of District.

D. Install sleeves wherever raceways of any type pass through walls or floors above grade, except that sleeves are not required for drywall construction or laid up masonry construction used for interior partitions and not fire rated.

E. Use pipe or sheet steel sleeves for interior dry locations.

F. Install sleeves with both ends flush with wall surfaces and with upper ends 3" above floor surfaces. Install bottom end of floor sleeves flush with slabs if not concealed by ceiling system. Use steel pipe sleeves through floors.

G. Core drill existing concrete walls or slabs to pass new runs of conduit or tubing. Seal core drilled openings as described for sleeves.

3.11 MOUNTING HEIGHTS:

Mount disconnecting switches so height of operating handle at its highest position is maximum 78 inches above floor or platform. When installing switch next to existing switch, match mounting height of existing switch.

3.13 FIELD TESTS:

As an exception to requirements that may be stated elsewhere in the contract, the District shall be given minimum 5 working days' notice prior to each test. The Contractor shall provide all test equipment and personnel and submit written copies of all test results.

A. Distribution Conductors, 600 Volt Class: Test all conductors #10 AWG and larger to verify that no short circuits or accidental grounds exist. Tests shall be made using an instrument which applies a voltage of approximately 500 volts and providing a direct reading of resistance in ohms. Insulation resistance, corrected to 60°F, shall not be less than the following values:

250-750 kcmil 50 megohms
4-4/0 AWG 50 megohms
10-6 AWG 100 megohms

Record resistance readings, temperature and weather conditions on the test form.

B. Operational Tests: Demonstrate the operation of each switch, relay and other item of electrical control with the system fully energized and operating. Each shall be demonstrated three times. Any faulty or defective Contractor furnished materials and workmanship found during the tests shall be replaced or corrected by the Contractor at no additional cost to the District.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes grounding and bonding of electrical and fire alarm systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field Test Reports: Submit written test reports to include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.04 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1. Comply with UL 467.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Grounding Conductors, Cables, Connectors, and Rods:

a. Apache Grounding/Erico Inc.
b. Copperweld Corp.
c. Erico Inc.; Electrical Products Group.
d. Ideal Industries, Inc.
e. ILSCO.
f. Kearney/Cooper Power Systems.
g. O-Z/Gedney Co.; a business of the EGS Electrical Group.
h. Raco, Inc.; Division of Hubbell.
i. Thomas & Betts, Electrical.

2.02 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Division 16 Section "Conductors and Cables."

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Grounding Electrode Conductors: Stranded cable.

E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.

F. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B 3.
2. Assembly of Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

G. Copper Bonding Conductors: As follows:

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

2.03 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.04 GROUNDING ELECTRODES

A. Ground Rods: Copper clad

1. Size: 1/2” in diameter by 96 inches long.

PART 3 - EXECUTION

3.01 APPLICATION

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Exothermic-Welded Connections: Use for connections to structural steel and for under-

ground connections, except those at test wells.

D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

3.02 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install equipment grounding conductors in all circuits.

C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by 2016 CEC:

1. Flexible raceway runs.

D. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for low voltage and data cables.

3.03 INSTALLATION

A. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.

1. Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
3. Refer to portable building grounding details on drawings.

B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

3.04 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.

5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.05 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:

1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.

3.06 GRADING AND PLANTING

A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. GRC: Galvanized Rigid metal conduit.

1.04 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.05 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Equipment supports.

1.06 QUALITY ASSURANCE

A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Unistrut; Tyco International, Ltd. With OSHPD OPM 0052 -16
b. Mason Industries with OSHPD OPM 0043-16

2. Metallic Coatings: Hot dip galvanized after fabrication and applied according to MFMA - 4.
3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA - 4.
4. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated/stainless steel, for use in hardened Portland cement concrete or masonry with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Hilti Inc. with ICC ES ESR 1917 at Concrete and 1385 at Masonry
ITW Ramset/Red Head; with ICC ES ESR 2427 at concrete.
Simpson Strong Tie with ICC ES ESR 1771 at Concrete and ESR 1396 at masonry.

2. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
3. Hanger Rods: Threaded steel, per ASTM A 36

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.01 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacing's less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT/IMC/RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Masonry: Approved expansion anchor fasteners on solid masonry units.
2. To Existing Concrete: Expansion anchor fasteners.

3. To Light Steel: Sheet metal screws.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

3.04 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

   1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 05 53
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

C. Conduit markers.

D. Identification for raceways.

E. Underground-line warning tape.

F. Instruction signs.

G. Equipment identification labels.

H. Miscellaneous identification products.

1.02 APPLICABLE PUBLICATIONS:

The following publications form a part of this specification. The publications are referred to in the text by the basic designation only.

A. American National Standards Institute, Inc. (ANSI) Publications:

1. 2016 Edition of National Electrical Safety Code with 2016 California Electrical Code (CEC) amendments.
2. Z35.1-72 Accident Prevention Signs

B. State of California Administrative Code:

1. Title 8, Industrial Relations

C. National Fire Protection Association (NFPA) Publication:

1. 2016 California Electrical Code.

D. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

E. Comply with ANSI Z535.4 for safety signs and labels.

F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.03 SUBMITTALS

A. Submit under provisions of Division 1 and Division 26.

B. Product Data: Provide data for nameplates, labels, conduit and wire markers.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

PART 2 - PRODUCTS

2.01 LABELS

A. Vinyl Labels for Raceways Carrying fire alarm Circuits: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

B. Manufacturers: Subject to compliance with requirements provide products by one of the following:

a. Brady Corporation.
b. Champion America.
c. emedco.
d. LEM Products Inc.
e. Panduit Corp.

C. Self-Adhesive Labels:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. emedco.
c. Ideal Industries, Inc.
d. LEM Products Inc.
e. Panduit Corp.

2. Preprinted, 3-mil- thick, polyester/vinyl flexible label with acrylic pressure-sensitive adhesive.

3. Polyester/Vinyl, thermal, transfer-printed, 3-mil- thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

a. Nominal Size: 3.5-by-5-inch.

2.02 TAPES AND STENCILS:

A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Carlton Industries, LP.
b. Champion America.
c. Ideal Industries, Inc.

d. Panduit Corp.

B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Carlton Industries, LP.
c. emedco.

C. Underground-Line Warning Tape

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Ideal Industries, Inc.
c. LEM Products Inc.
d. Marking Services, Inc.
e. Seton Identification Products.

2. Tape:

a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
b. Printing on tape shall be permanent and shall not be damaged by burial operations.
c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.

3. Color and Printing:

a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
c. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, , COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".

4. Tag: Type I:

a. Pigmented polyolefin, bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
b. Width: 3 inches.
c. Thickness: 4 mils. Weight: 18.5 lb/1000 sq. ft..
d. Tensile according to ASTM D 882: 30 lbf and 2500 psi.

5. Tag: Type ID:

a. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
b. Width: 3 inches.

c. Overall Thickness: 5 mils.
d. Foil Core Thickness: 0.35 mil.
e. Weight: 28 lb/1000 sq. ft..
f. Tensile according to ASTM D 882: 70 lbf and 4600 psi.

6. Tag: Type IID:

a. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
b. Width: 3 inches
c. Overall Thickness: 8 mils.
d. Foil Core Thickness: 0.35 mil
e. Weight: 34 lb/1000 sq. ft.
f. Tensile according to ASTM D 882: 300 lbf and 12,500 psi.

2.03 Tags

A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Carlton Industries, LP.
c. emedco.
d. Seton Identification Products.

B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.023 inch thick, color-coded for phase and voltage level, with factory screened permanent designations; punched for use with self-locking cable tie fastener.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Carlton Industries, LP.
c. emedco.
d. LEM Products Inc.
e. Panduit Corp.

C. Write-On Tags:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Carlton Industries, LP.
b. LEM Products Inc.
c. Seton Identification Products.

2. Polyester Tags: 0.015-inch-thick, with corrosion-resistant grommet and cable tie for attachment to raceway, conductor, or cable.

3. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
4. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.04 Signs

A. Baked-Enamel Signs:

1. Preprinted aluminum signs punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal Size: 7 by 10 inches.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Carlton Industries, LP.
b. Champion America.
c. emedco.

B. Metal-Backed Butyrate Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch galvanized-steel backing and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal Size: 10 by 14 inches.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Champion America.
c. emedco.

C. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:

a. For signs up to 20 sq. inches, minimum 1/16-inch-.
b. For signs larger than 20 sq. inches, 1/8 inch thick.

c. Engraved legend with black letters on white face.
d. Punched or drilled for mechanical fasteners.
e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Brady Corporation.
b. Carlton Industries, LP.
c. emedco.

2.05 CABLE TIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ideal Industries, Inc.
2. Marking Services, Inc.
3. Panduit Corp.

B. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch
2. Tensile Strength at 73 deg F according to ASTM D 638: 12,000 psi
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

C. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F according to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F
4. Color: Black.

D. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, self-locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F according to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F
5. Color: Black.

2.06 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.01 General

1. Devices mounted within and part of an equipment including control devices, control relays, indication devices and instruments.
2. Initiating and notification devices: install I.D. and circuit/device identification labels at each device to match fire alarm riser diagram.
3. Attic heat detectors: Provide labels below ceiling to identify the location of such detectors. Install identification label at T-bar grid.
4. Duct detectors, fire smoke dampers and similar devices identifying location and device identification.

3.02 INSTALLATION

A. Install identification materials and devices at locations for most convenient viewing without

interference with operation and maintenance of equipment and without opening the ceiling tiles.

B. Apply identification devices to surfaces that require finish after completing finish work.

C. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

D. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.

E. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

F. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

3.03 IDENTIFICATION SCHEDULE

A. Accessible Raceways Fire Alarm Circuits: Identify with self-adhesive vinyl tape applied in bands. Install labels at 10-foot maximum intervals.

B. Fire Alarm Circuit Conductor Identification: For conductors and cables in pull and junction boxes and hand holes, use self-adhesive, self-laminating polyester labels/self-adhesive vinyl labels with the conductor or cable designation, origin, and destination.

C. Fire Alarm Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive, self-laminating polyester labels/self-adhesive vinyl labels with the conductor designation.

D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker-tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

E. Locations of Underground Lines: Identify with underground-line warning tape for fire alarm wiring.

F. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated.

G. Warning Labels for Indoor Cabinets, Boxes, and Enclosures: Self-adhesive warning labels.

1. Comply with 29 CFR 1910.145.
2. Identify system with black letters on an orange background.

3. Apply to exterior of door, cover, or other access.

H. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of fire alarm systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

I. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for emergency operations.

J. Equipment device Identification Labels: On each unit of equipment and devices, install unique designation label that is consistent with fire alarm riser wiring diagrams, schedules, and operation and maintenance manual.

1. Labeling Instructions:

a. Indoor Equipment: Engraved, laminated acrylic or melamine plastic label, punched or drilled for mechanical fasteners. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
b. Outdoor Equipment: Engraved, laminated acrylic or melamine label 4 inches high.
c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
d. Unless labels are provided with self-adhesive means of attachment, fasten them with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Lighting and appliance branch-circuit panel boards.

1.3 PERFORMANCE REQUIREMENTS

A. Lighting and appliance panel boards shall be qualified for use in seismic areas as follows:

1. High seismic loading as defined in IEEE Std. 693-1997, with 1.3 amplification factor.
2. IBC-2016, Sds = 2.08g, Ss = 150%, Ip = 1.5, for all z/h greater than 0 and Sds = 2.08 g, Ss = 240%, Ip = 1.5, for z/h equal to 1 in accordance with ASCE – 7 Chapter 13
3. Seismic compliance shall be qualified only through shake table testing. Compliance by calculation is not acceptable.
4. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.4 SUBMITTALS

A. Product Data: For each type of panel board, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panel board and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panel boards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.
8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panel boards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

C. Seismic Qualification Certificates: Submit certification that panel boards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in 1.3.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

D. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

E. Panel board Schedules: For installation in panel boards. Submit final versions after load balancing.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain panel boards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panel boards including clearances between panel boards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NEMA PB 1.

E. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and prepare panel boards for installation according to NECA 407 & NEMA PB 1.

1.7 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panel boards until spaces are enclosed and weather tight, wet work in spaces is complete and dry, work above panel boards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a. Ambient Temperature: Not exceeding minus 22 deg F to plus 104 deg F.
b. Altitude: Not exceeding 6600 feet.

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect & Construction Manager no fewer than fourteen days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Architect's & Construction Manager's written permission.

3. Comply with NFPA 70E.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

PART 2 PRODUCTS (SQUARE-D is district standard)

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panel boards according to IEEE 344 to withstand seismic forces defined in 1.3

B. Enclosures: Surface mounted NEMA 3R mounted cabinets with pad lockable provisions.

1. Rated for environmental conditions at installed location.

a. Exterior Locations: NEMA 250, Type 3R.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Gutter Extension and Barrier: Same gage and finish as panel board enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
5. Finishes:

a. Panels and Trim: galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.

6. Directory Card: Inside panel board door, mounted in metal frame with transparent protective cover.

C. Incoming Mains Location: Top.

D. Phase, Neutral, and Ground Buses:

1. Material: Copper.
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

E. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Copper.
2. Main and Neutral Lugs: Compression type.
3. Ground Lugs and Bus-Configured Terminators: Mechanical lug type.
4. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device, if shown on the drawings.
5. Sub feed (Double) Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device, , if shown on the drawings.
6. Gutter-Tap Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device, , if shown on the drawings.

F. Service Equipment Label: NRTL labeled for use as service equipment for panel boards or load centers with one or more main service disconnecting and overcurrent protective devices.

G. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

H. Panel board Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.

2.2 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Square- D or Approved equal.

B. Panel boards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker as indicated on the drawings.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Square-D no equal.

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits

a. Handle Clamp: loose attachments, for holding circuit-breaker handle in on position.

2.4 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store panel boards according to NECA 407& NEMA PB 1.1.

B. Examine panel boards before installation. Reject panel boards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panel boards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install panel boards and accessories according to NECA 407 & NEMA PB 1.1.

1. Attach panel board to the vertical finished or structural surface behind the panel board.

B. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

C. Mount top of trim 90 inches above finished floor unless otherwise indicated.

D. Mount panel board cabinet plumb and rigid without distortion of box. Mount recessed panel boards with fronts uniformly flush with wall finish and mating with back box.

E. Install filler plates in unused spaces.

F. Stub four 1-inch empty conduits from panel board into accessible ceiling space or space designated to be ceiling space in the future.

G. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

H. Comply with NECA 1.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

B. Create a directory to indicate installed circuit loads after balancing panel board loads; incorporate District's final room designations. Obtain approval before installing. Use a typewriter to create directory; handwritten directories are not acceptable.

C. Panel board Nameplates: Label each panel board with a nameplate complying with requirements for identification specified in Division 16 Section "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in distribution panel boards with a nameplate complying with requirements for identification specified in Division 16 Section "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test insulation resistance for each panel board bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Tests and Inspections: (By Contractor)

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Prepare test and inspection reports, including a certified report that identifies panel boards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken and observations after remedial action.

3.5 ADJUSTING (Contractor).

A. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 10 percent between phase loads, within a panel board, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

END OF SECTION

SECTION 26 05 10

ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE

Electrical General Requirements specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements. Work includes but is not necessarily limited to the following:

A. Definitions, guarantees, submittals, clean-up, "As-Builts" and all other applicable requirements of Division 0 and Division 1 apply to the work of this section.

B. Examine all other sections for work related to those sections which are required to be provided as work under this Division & Sections.

C. Coordinate all work in this Division with related trades.

D. Furnish and install the following:

1. Incidental items not indicated on the drawings nor mentioned in the Specifications that belong to the work described, or are required to provide complete operable systems, as though called out here in every detail.
2. All construction power and lighting and all power for testing of equipment and systems through final acceptance tests.
3. All equipment and facilities required to provide temporary and permanent services.
4. Electrical, Fire Alarm and low voltage systems distribution systems, including panel boards, conduit, wiring, pull boxes, equipment, devices and programming.
5. All required electrical work for the fire alarm and low voltage systems.
6. Conduits, device and equipment back boxes and cabinets or terminal boards for the fire alarm systems. Work related listed below shall be included in this Division of the work. Furnish and install the following:

    a. All conduits, outlets, device boxes, wiring, interfacing with Fire Alarm System and control devices required for the specified operation of the equipment.

7. Furnishing and installation of all hangers, anchors, sleeves, chases and supports, for all electrical materials and equipment.
8. Cleaning, patching, repairing and painting.

1.2 APPLICABLE PUBLICATIONS AND STANDARDS

The following publications form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American National Standards Institute, Inc. (ANSI) Publications

B. State of California Administrative Codes

C. National Electrical Manufacturers Association (NEMA) Publication

D. National Fire Protection Association (NFPA) Publications

E. Underwriters Laboratories, Inc. (UL) Publications.

F. All current codes and regulations enforced by Division of State Architects. (DSA)

1.3 WORK SEQUENCE

A. Install work in to accommodate District's occupancy requirements. During the construction period, coordinate work schedule and operations with District's and Architect.

1.4 DEFINITIONS

A. The words "work" or "electrical work" herein include products, labor, equipment, tools, appliances, transportation and all related items, directly or indirectly required to complete the specified and indicated fire alarm installation.

B. The word "concealed" shall mean that the installation will not be visible when all permanent or removable elements of the construction are in place. The word "exposed" shall mean that the installation is visible when all permanent or removable elements of the construction are in place.

C. The word "code" shall mean any and all regulations and requirements of regulatory agencies, public and private, having jurisdiction over the work involved.

D. The word "product" used in Division 16 means all material, equipment, machinery, and/or appliances directly or indirectly required to complete the specified and/or indicated electrical work.

E. The words "standard product" shall mean a manufactured product, illustrated and/or described in catalogs or brochures, which are in general distribution prior to the date of issue of construction documents for bidding. Products will generally be identified by means of a specific catalog number and manufacturer's name.

F. The word "provide shall mean furnish and install and where applicable shall also mean connect, complete installation and test.

G. The words "powered equipment", as used in Division 16, shall mean a complex product converting and electrical energy source to:

1. Heat energy.
2. Mechanical power.
3. Direct current.
4. Electrical energy differing in frequency.

1.5 CONTRACTOR FURNISHED PRODUCTS

Unless noted otherwise, all items shall be furnished by the Contractor for a complete and operational fire alarm installation.

A. All items required for a complete and operational installation shall be furnished and installed by the Contractor.

1.6 DISCREPANCIES

A. Where a conflict in requirements occurs between the specifications and drawings, or in the specifications or on the drawings, and a resolution is not obtained from the District/Architect before the bidding date, the more expensive alternate will become the contractual requirements.

B. Omissions from the drawings or specifications or the miss-description of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or miss-described details of the work but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

C. The Contractor shall check all drawings furnished to him immediately upon their receipt and shall promptly notify the Architect of any discrepancies. Figures marked on drawings shall in general be followed in preference to scale measurements. Large scale drawings shall in general govern small scale drawings. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.

1.7 CHANGES

A. The Contractor shall be responsible to make and obtain approval for all necessary adjustments in fire alarm circuiting as required to accommodate the locations of equipment and/or devices which are affected by any approved authorized changes. All changes shall be clearly indicated on the "As-Built" drawings. A copy of the progress “As-Built” drawings shall be kept at job site for review by Inspector of Record (IOR)/Architect/Engineer/District.

1.8 SUBMITTALS

A. Submit shop drawings, manufacturer's data certificates for equipment, materials and finish, and pertinent details for each system where specified in each individual section, and obtain approval before procurement, fabrication, or delivery of the items to the job site. Partial submittals are not acceptable and will be returned without review. Include the manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable technical society publication references, and other information necessary to establish contract compliance of each item the Contractor proposes to furnish. Photographs of existing installations and data submitted in lieu of catalog data are not acceptable and will be returned without approval. Contractor shall be responsible for reviewing and certifying submittals as conforming to the drawings and specifications prior to submittal and shall verify conformance of equipment as delivered with final shop submittals, specifications and plans. Contractor shall report to Architect any deviations prior to initiation of construction. Contractor is responsible for promptly reporting to District any news of late equipment delivery which is likely or certain to delay installation.

B. Submit under provisions of Division 1.

C. Proposed Products List: Include Products specified in the following Sections:

1. Section 26 05 50 - Basic Materials and Methods
2. Section 26 05 26 - Grounding and Bonding
3. Section 26 05 29 - Hanger Support
4. Section 26 05 53 - Electrical Identification
5. Section 26 24 16 - Panelboards
6. Fire Alarm System (per drawings)
7. Low voltage Systems (per drawings)

D. Submit shop drawings and product data grouped and referenced by the technical Section numbers.

E. The Contractor shall be responsible for all equipment ordered and/or installed prior to receipt of shop drawings returned from the district bearing the engineer's stamp of “Reviewed". All corrections or modifications to the equipment as noted on the shop drawings shall be performed and equipment removed from the job site at the request of the Architect without additional compensation.

F. Shop Drawings: Drawings shall be full size as bid set drawings with a minimum scale of 1/8-inch per foot, except as specified otherwise. Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, duct work, and other items that must be shown to assure a coordinated installation. In wiring diagrams, identify circuit terminals and indicate the internal wiring for

each item of equipment and the interconnection between each item of equipment. Indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. If equipment is disapproved, revise drawings to show acceptable equipment and resubmit.

G. Manufacturer's Data: For each manufactured item, provide current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves if applicable, and catalog cuts.

H. Standard Compliance: When materials or equipment provided by the Contractor must conform to the standards of organizations such as American National Standards Institute (ANSI) or Underwriters' Laboratories (UL), submit proof of such conformance to the Architect for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified. In lieu of the label or listing, submit a certificate from an independent testing organization, which is competent to perform acceptance testing and is approved by the District. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item conforms to the specified organization's standard.

I. Certified Test Reports: Before delivery of materials and equipment, certified copies of all test reports specified in individual sections shall be submitted for approval.

J. Certificates of Compliance or Conformance: Submit manufacturer's certifications as required on products, materials, finish, and equipment indicated in the technical sections. Certifications shall be documents prepared specifically for this contract. Pre-printed certifications and copies of previously submitted documents will not be acceptable. The manufacturer's certifications shall name the appropriate products, equipment, or materials and the publication specified as controlling the quality of that item. Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as"; or "achieve the same end use and results as materials formulated in accordance with the referenced publications"; or "equal or exceed the service and performance of the specified material." Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance or conformance.

1.9 REGULATORY REQUIREMENTS

A. Electrical: Conform to NFPA 70, ANSI C2, and C.A.C. (California Administrative Code) Title 24, NFPA 101, 2016 C.E.C. and all other state and local codes.

B. The requirements of authorities shall be the minimum acceptable requirements for the work, and nothing described in these Specifications or indicated on the drawings shall be construed to permit work not conforming to the most stringent of the applicable codes and regulations. When drawings or specifications call for materials or construction of better quality of larger size than required by codes, laws, rules and regulations, the drawings and specifications shall take precedence.

C. Equipment not complying with applicable codes and not listed by CSFM shall be removed and replaced with approved equipment at Contractor's expense. UL listing labels, where applicable, shall be installed prior to shipment from factory.

D. Obtain and request inspections from authority having jurisdiction (IOR).

1.10 PRODUCT ALTERNATES OR SUBSTITUTIONS

A. Where a manufacturer's product is specified, the intent is to establish definite quality, construction and performance characteristics. The manufacturer's latest published catalog data for the product shall become part of this specification as though stated herein to the extent that such data establishes quality desired, testing procedures, safety features, life

expectancy, performance characteristics and, in the case of finish material, the general appearance. Substitute products, where permitted, will be required to equal or exceed these various requirements as established by the specified product manufacturer's literature. Specified Edwards EST-3 is district's standards for Fire Alarm system – no other alternate manufacturer will be allowed.

1.11 GUARANTEE

A. Except as may be specified under other sections in the Specifications, guarantee all equipment furnished under the Specifications for a period of one year from date of acceptance against defective workmanship and material and improper installation. Upon notification of failure, correct deficiency immediately and without cost to the District.

B. Standard warranty of manufacturer shall apply for replacement of parts after expiration of the above period. Manufacturer shall furnish replacement parts to the District or their service agency as directed. Furnish manufacturer's warranties in accordance with Division 0 of this Specification.

1.12 PROJECT/SITE CONDITIONS

A. Install work in locations shown on drawings, unless prevented by project conditions.

B. Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other Sections. Obtain permission of District before proceeding.

1.13 OPERATION AND MAINTENANCE MANUAL

Submit as required for systems and equipment indicated in the technical sections. Furnish six copies, bound in hardback binders or an approved equivalent. Furnish one complete manual prior to performance of systems or equipment tests and furnish the remaining manuals prior to contract completion. Inscribe the following identification on the cover; the words "OPERATION AND MAINTENANCE MANUAL," the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment. Include a table of contents and assemble the manual to conform to the table of contents, with the tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in. The manual shall include:

A. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the system or equipment.

B. A control sequence describing startup, operation, and shutdown.

C. Description of the function of each principal item of equipment.

D. Installation and maintenance instructions.

E. Safety precautions.

F. Diagrams and illustrations.

G. Testing methods and test equipment required.

H. Performance data.

I. Parts list. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.

J. Appendix: List qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

1.14 POSTED OPERATING INSTRUCTIONS

Furnish approved operating instructions for systems and equipment indicated in the technical sections for use by operation and maintenance personnel. The operating instructions shall include wiring diagrams, control diagrams, and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions as directed. Attach or post operating instructions adjacent to each principal system and equipment including startup, proper adjustment, operating, lubrication, shutdown, safety precautions, procedure in the event of equipment failure, and other items of instruction as recommended by the manufacturer of each system or equipment.

Provide weather-resistant materials or weatherproof enclosures for operating instructions exposed to the weather. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

1.15 INSTRUCTION TO DISTRICT PERSONNEL

Where indicated in the technical sections, furnish the services of competent instructors to give full instruction to District personnel in the adjustment, operation, and maintenance of systems and equipment, including pertinent safety requirements as required. Each instructor shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Coordinate schedule of instructional class with District during the first regular work week after the equipment or system has been accepted and turned over to District for regular operation.

1.16 CATALOGED PRODUCTS/SERVICE AVAILABILITY

Materials and equipment shall be current products by manufacturers regularly engaged in the production of such products. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The 2-year period shall be satisfactorily completed by a product for sale on the commercial market through advertisements, manufacturer's catalogs, or brochures. Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, is furnished. The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.17 MANUFACTURER'S RECOMMENDATIONS

Where installation procedures or any part thereof are required to be in accordance with manufacturer's recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendations shall be cause for rejection of the equipment or material.

1.18 DELIVERY AND STORAGE

Handle, store, and protect equipment and materials in accordance with the manufacturer's recommendations and with the requirements of NFPA 70B P, Appendix I, titled "Equipment Storage and Maintenance During Construction." Replace damaged or defective items with new items.

1.19 ELECTRICAL REQUIREMENTS

Furnish internal wiring for components of packaged equipment as an integral part of the equipment. Power wiring and conduit shall conform to the requirements of Section 16050 "Basic Materials and Methods."

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 Arrange all inspections from IOR/Architect/District, including testing required to verify standard compliance, and deliver certificates for same to District. All work shall conform to the latest requirements adopted by Division of State Architect including NFPA 70, Title 24, California Code of Regulations (CCR) & 2016 California Building Codes.

3.2 WORK RESPONSIBILITIES

A. The drawings indicate diagrammatically the desired locations or arrangement of conduit runs, outlets, equipment, etc., and are to be followed as closely as possible. Proper judgement must be exercised in executing the work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference with structural and existing conditions. The contractor is responsible for the correct placing of his work and the proper location and connection of his work in relation to the work of other trades. Advise appropriate trade as to locations of access panels.

B. Locations shown on plans shall take precedence but where a conflict is evident, notify the Architect for instructions.

C. In the event changes in the indicated locations or arrangements are necessary, due to developed conditions in the existing building conditions or rearrangement of furnishings or equipment, such changes shall be made without extra cost, provided the change is noted before the conduit runs, etc., and work directly connected to same is installed and no extra materials are required.

D. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with any work, carefully check and verify all dimensions, sizes, etc. with the shop drawing submittals to see that the equipment will fit into the spaces provided without violation of applicable codes.

E. Should any changes to the work indicated on the drawings or described in the specifications be necessary in order to comply with the above requirements, notify the Architect immediately and cease work on all parts of the contract which are affected until approval for any required modifications to the construction has been obtained from the DSA through Construction Change Directive (CCD) and from Architect.

F. Be responsible for any cooperative work which must be altered due to lack of proper supervision or failure to make proper provisions in time. Such changes shall be under direction of the Architect and shall be made to his satisfaction.

G. Perform all work with competent and skilled personnel.

H. All work, including aesthetic as well as electrical and mechanical aspects of the work, shall be of the highest quality consistent with the best practices of the trade.

I. Replace or repair, without additional compensation, and any work which, in the opinion of the Architect, does not comply with these requirements.

3.3 PAINTING OF EQUIPMENT

A. Factory Applied: Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test, except equipment specified to meet requirements of ANSI C37.20 shall have a finish as specified in ANSI C37.20.

B. Field Applied: Paint electrical equipment as required to touch up, to match finish on other equipment in adjacent spaces or to meet safety criteria.

C. When not covered under the painting section of the specifications, all electrical work exposed to view shall be painted to match surroundings. Work to be painted shall include conduit, hangars, and outlet boxes; pull boxes, surface raceway and similar items.

END OF SECTION

SECTION 26 86 00.D
ELECTRICAL TESTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes general requirements for electrical field testing and inspecting. Detailed requirements are specified in each Section containing components that require testing. General requirements include the following:

1. Qualifications of testing agencies and their personnel.
2. Suitability of test equipment.
3. Calibration of test instruments.
4. Coordination requirements for testing and inspecting.
5. Reporting requirements for testing and inspecting.

1.03 QUALITY ASSURANCE

A. Testing Agency Qualifications: As specified in each Section containing electrical testing requirements and in subparagraph and associated subparagraph below.

1. Testing Agency's Field Supervisor for Fire Alarm System Testing: Person currently certified by the NICET to supervise on-site testing and Certified EST Technician experienced in programming and networking of EST-3 control panels.

B. Test Equipment Suitability: Comply with NETA ATS, Section 5.2.

C. Test Equipment Calibration: Comply with NETA ATS, Section 5.3.

D. Refer to Section 27 10 00 for Data and Network cable system for required tests and cable certifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 GENERAL TESTS AND INSPECTIONS

A. If a group of tests are specified to be performed by an testing agency/personnel, prepare systems, equipment, and components for tests and inspections, and perform preliminary tests to ensure that systems, equipment, and components are ready for testing. Include the following minimum preparations as appropriate:

1. Perform insulation-resistance tests.
2. Perform continuity tests.
3. Grounding tests.
4. Programming and networking of all fire alarm control panels, power supplies and devices

5. Perform operational test per NFPA/NEC/CEC and all operational test shall be witnessed by IOR and approved by IOR and District.

B. Test and Inspection Reports: In addition to requirements specified elsewhere, report the following:

1. Manufacturer's written testing and inspecting instructions.
2. Calibration and adjustment settings of adjustable and interchangeable devices involved in tests.
3. Tabulation of expected measurement results made before measurements.
4. Tabulation of "as-found" and "as-left" measurement and observation results.
5. Additional requirements listed in each section of the Division 16 specifications.

END OF SECTION

SECTION 321216 HOT-MIX ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Hot-mix asphalt paving.
2. Slurry Seal.

1.2 SUBMITTALS

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

B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

C. Material certificates.

D. Log of placement of asphalt, including dates, times, temperature readings and other pertinent information.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be registered with and approved by authorities having jurisdiction or the Department of Transportation (DOT) of the state in which Project is located.

B. Standard Specifications: Comply with the Standard Specifications for Public Works Construction (SSPWC) and the California Department of Transportation (Caltrans), latest editions and supplements for asphalt paving work. These Specifications apply only to performance and materials and how they are to be incorporated into the Work. The legal/contractual relationship sections and the measurement and payment sections do not apply to this document.

C. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Tack Coat: Minimum surface temperature of 60 degrees Fahrenheit.

2. Asphalt Base Course: Minimum surface temperature of 40 degrees Fahrenheit and rising at time of placement.

B. Asphalt Surface Course: Minimum surface temperature of 60 degrees Fahrenheit at time of placement.

C. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 degrees Fahrenheit for oil-based materials, 50 degrees Fahrenheit for water-based materials, and not exceeding 95 degrees Fahrenheit.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Coarse and fine aggregate shall conform to SSPWC sect6ion 203-6.2.2. Mineral filler, if required, shall conform to SSPWC section 203-6.2.4.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: Paving asphalt, viscosity grade PG 64-10 conforming to Section 92 of the Caltrans Standard Specifications.

B. Tack Coat: PG 64-10 conforming to Section 92 of the Caltrans Standard Specifications.

C. Mixes: Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mix III-C3 PG 64-10 designed in conformance with SSPWC Section 203-6.5.

2.3 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

2.4 SLURRY SEAL

A. Provide Caltrans Type I road slurry.

PART 3 - EXECUTION

3.1 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

1. Mill to a depth of one-and-one-half inches.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into

adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gallons/square yard.

C. Patching: Fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact flush with adjacent surface.

3.3 SURFACE PREPARATION

A. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

B. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

C. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gallons/square yard.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.4 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Spread mix at minimum temperature of 250 degrees Fahrenheit.

2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.5 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 degrees Fahrenheit.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot- mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

F. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus one-half inch.

2. Surface Course: Plus one-fourth inch (no minus).

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: One-fourth inch

2. Surface Course: One-eighth inch

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is one-fourth inch.

3.7 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for 30 days before starting pavement marking. Sweep and clean surface to eliminate loose material and dust.

C. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.9 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

END OF SECTION 321216

SECTION 32 3113

CHAIN LINK FENCING AND GATES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Supply and install Chain Link Fencing and Gates as indicated on plans.

1.02 RELATED SECTIONS

A. Section 02050: Demolition

B. Section 02770: Site Concrete Work.

1.03 REFERENCE STANDARDS

A. Standard Specifications for Public Works Construction, current edition.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete: Class 500-6-2500 concrete prepared as prescribed in Section 201-1 "Concrete, Mortar and Related Materials" of the Standard Specifications for Public Works Construction or at Contractor's option, may be mixed in the following volumetric proportions:

Portland Cement	1 Part
Fine Aggregate	2 Parts
Coarse Aggregate (1/4" to 1-1/2")	4 Parts
Water	7-1/2 Gallons, maximum per sack of cement

B. Chain Link Fence Fabric: Conforming to "Specifications for Zinc-Coated Steel Chain-Link Fence Fabric" ASTM A392-A.

1. Fabric shall be #9 gauge woven wire, 2" mesh, top and bottom edge knuckled, and hot-dipped galvanized after fabrication, Class I zinc coating, 1.20 oz. minimum per sq. ft. of uncoated wire surface, unless otherwise specified.

2. Fabric 12'-0" high or less shall be single width.

3. For 16'-0" high fences the upper 8'-0" of fabric may be #11 gauge.

4. Fabric for fencing on top of handball court shall be 1" mesh, #12 gauge wire minimum.

5. Fence fabric erected shall be free from barbs, icicles, or other projections resulting from galvanizing process, which might be hazardous. Fence fabric having such defects will be rejected even though it has been erected.

C. Posts, Top Rails, Brace Rails and Gate Frames: Galvanized, welded or seamless steel pipe conforming to ASTM F1083, schedule 40 for Class 1 or ASTM A569 for Class 1A. Class 1A shall have a minimum yield strength of 50,000 P.S.I.

Item	Nominal Pipe Size Inches	Outside Diameter Inches	Weight per foot (Pounds) Class 1	Class1A
Top Rail, Brace Rails and Transom Rails	1-1/4	1.660	2.27	1.82
Gate Frames	1-1/2	1.900	2.72	2.28
Line Posts	2	2.375	2.65	3.12
Terminal, Corner, Angle, Pull & Pedestrian Gate Posts	2-1/2	2.875	5.79	4.64
Driveway Gate Posts: Opening to 17'-3-1/2"	3	3.5	7.58	5.71
Opening 17'-4" to 20'-3-1/2"	3-1/2	4	9.11	6.56

D. Post Caps: Malleable iron, (ASTM A47, Grade 32510), designed to fit snugly over posts with a minimum projection of 1-1/2" below top of posts. Post caps shall be made with curved top.

E. Eye Tops: Malleable iron, (ASTM A47, Grade 32510), designed to fit over line posts, and for through passage of top rail.

F. Expansion Sleeve Couplings for Top Rails: Steel, 6" long, designed to fit tightly on inside of rail, fitted with raised center.

G. Rail Ends for Top Rails and Brace Rails: Malleable iron, (ASTM A47, Grade 32510), with holes to receive 3/8" bolts for securing to rail end bands.

H. Tension Bands and Bands for Securing Rail Ends: Mild steel flats, not less than 1/8" x 1", except tension bands in gates shall be 1/8" x 3/4". Bolts for use with tension bands and rail end bands shall be 3/8" x 1-1/2".

I. Tension Bars: Mild steel flats not less than 3/16" x 3/4".

J. Tension Wire for Installation at Bottom of Fabric: #6 gauge steel wire, conforming to requirements of AISI Steel Products Manual, Carbon Steel Wire, Section 16, merchant quality, galvanized, soft temper with Type I coating.

K. Turnbuckles for use with Tension Wires: Eye and eye type, drop forged steel, right and left hand threads, not less than 5/16" screw diameter with not less than 4-1/2" take-up.

L. Tie Wire: Soft annealed galvanized steel wire. #9 gauge wire, or #6 gauge aluminum ties for fastening fabric to posts, top rails and brace rails. At bottom tension wire #9 gauge galvanized hog rings shall be used.

M. Finish of Metal Parts: Post caps, couplings, rail ends, tension bands, tension bars, turnbuckles, rivets, bolts, and all other metal parts and fittings to be hot-dipped galvanized after fabrication, except bolts, which may be galvanized or cadmium-plated.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Fence heights indicated on Drawings refer to height of fence fabric.

B. Space fence posts at equal intervals between terminal, angle, corner, and gate posts, and not more than 10'-0" apart measured from center to center of posts. In curved fence sections having a radius of 50'-0" or less, space posts not more than 5'-6" apart. Set posts so that top of eye of post caps are level with top of fabric.

C. Install angle or corner posts at each change in direction of 15 degrees or more, at change of 5% or more in grade of fencing, and at the beginning and end of all curved fence sections.

D. Install terminal posts at ends of runs of fencing. Install gate posts on both sides of driveway and pedestrian gates. For double leaf gates, net opening between gate posts shall be gate size as noted on Drawings plus 3-1/2"; for single leaf gates, net opening shall be gate size plus 2-1/2".

E. All fence post concrete footing shall be 14" in diameter, except for line posts which shall be 12" in diameter. For fences 6'-0" and over set posts 30" into footings cast 36" deep into solid ground and for under 6'-0", set posts 18" into footings cast 24" into solid

ground. Align posts and set plumb and true. In bituminous surfaced areas, cover top of concrete footings with seal coat. Remove all cement from exposed pipe surfaces while cement is still soft.

F. Install all fences with top rail. Top rail shall pass through eye tops and be secured at ends with rail-end fittings and bands.

G. Provide all fences over 10'-0" in height, in addition to top rail, with a horizontal mid-rail set at mid-height of fence. Furnish "Star" fittings for installation of mid-rail. In fences higher than 10'-0" set brace rails at all angles, corners, and terminals at 1/4th and 3/4th of fence height.

H. Provide one horizontal brace rail in all panels adjacent to terminal, angle, corner, and gate posts, set at mid-height of fence and rigidly secured to posts with rail end fittings and bands. Provide horizontal brace rails, as specified, in all panels of curved sections having a radius of 50'-0" or less. Brace rails are not required in fencing 4'-0" or less in height.

I. Provide a transom rail and fabric at top of all pedestrian gate openings. Set transom rail 6'-8" above high point of grade at gate opening. Ends of transom rails shall be pinned or riveted to rail end fittings with 1/4" mild steel rivets.

J. Install bottom tension wire a minimum of 3" from grade for all fencing, and provide with turnbuckle for each 150'-0" of wire or fractional part thereof. Turn-buckles are not required in runs of 25'-0" or less. Securely attach ends of tension wires to posts in a manner to prevent slipping or loss of tension. Turn end of wire around post twisted not less than 3 times around wire. At turnbuckles, wire through eye and twist end not less than 3 times around wire.

K. Install fence fabric on outward facing side of posts, top edge projecting above top rail of fence.

L. Set bottom of fence fabric to clear finish grades, except on bituminous surface set 3/4" above such surface. Locally shape and trench ground surfaces where necessary to provide uniform top and bottom alignment of fence.

M. Tightly stretch fabric and at terminal, pull corner, angle, and gate posts, secure with tension bars extending full height of fence. Secure tension bars to posts with bolted tension bands spaced not more than 14" apart.

N. Bands and Ties: Install bands and ties in accordance with following schedule:

7 bands on 8'-0" fence	7 ties on 8'-0" fence
6 bands on 6'-0" fence	6 ties on 6'-0" fence

4 bands on 4'-0" fence 4 ties on 4'-0" fence

O. Fasten fabric to line posts with wire ties spaced not more than 16" apart. Where #9 gauge wire or #6 gauge aluminum ties are used, hook the tie at both ends. Use of hooked ties with links will not be permitted.

P. Fasten fabric to top rails, mid-rails, brace rails, and bottom tension wire with wire ties spaced not more than 18" apart. Bend back ends of tie wires so as not to be a hazard. At bottom tension wire, use hog rings spaced not more than 18" apart. Where 2 fabrics are used, lap the fabrics one mesh at mid-rail and tie both fabrics with #9 gauge wire or #6 gauge aluminum ties to midrails.

Q. Field welds shall be cleaned of flux and spatter, all damaged galvanizing removed, all hazardous projections ground off, properly prepared, then heavily coated with any of the approved coatings and in strict accordance with manufacturer's directions.

1. Caroline Carbomastic 15
2. "Galvalloy", distributed by Metalloy Products Company, Newport Beach, CA.
3. or approved equal

R. Fabrication of Gates:

1. Frames: Fabricate gate frames from steel pipe of size specified, with joints at corners miter cut and continuously welded to sides.

2. Fabric: Attach fence fabric to side members with tension bars and tension bands as specified, spaced not more than 14" apart. Tension bars shall extend full height of gate. Attach fence fabric to top and bottom members and to brace rail with wire ties as specified for top rails, spaced not more than 12" apart.

3. Latches: Furnish gate latches and strikes. Weld gate latches and strikes to gate posts and frames. Welding shall be done before gate frames are galvanized, or welds shall be finished as specified for field welds.

4. Hinges: Furnish hinges, including bolts, of type allowing gate to swing back parallel to line of fencing. Install and adjust hinges; burr or center punch threads of gate hinge bolts to prevent removal of nuts. Install 3 hinges on each post for swing gates more than 16'-0" wide.

5. Grind all welds flush and smooth, hot-dip galvanize all fabricated parts after welding, or in lieu there of, finish all welds as specified for field welds.

3.02 TENNIS COURTS PERIMETER FENCING

A. Perimeter fences for tennis courts shall not be less than 12'-0" in height with all #11 gauge, 1-3/4" mesh chain link fabric in the upper half, and #9 gauge 1-3/4" mesh chain link fabric in the lower half with horizontal mid-rail. Furnish “Star” fittings for installation of mid-rail. Install fabric on court side of posts.

3.03 FENCING ON TOP OF HANDBALL COURT WALLS

A. Posts, rails, chain link fabric and all accessories required for a complete installation shall be as specified, except that chain link fabric shall be 1" mesh, and #9 gauge wire, minimum.

3.04 INSTALLATION ON TOP OF CONCRETE WALLS

A. For fencing installed on concrete walls, set posts in #24 gauge galvanized iron inserts not less than 15" long. Inside diameter of inserts shall be 1" greater than outside diameter of posts. Set posts plumb and true and fill joint space with cement grout or Hallemite Mfg. Co's "Por-Rok" finished flush with top of wall. Remove all excess grout and clean posts.

B. Where height from top of wall to bottom of wall footing is less than 22" embed posts at least 30" into concrete and provide concrete fence post footings as specified, to a depth of 36" below top of wall.

3.05 REINSTALLED FENCING

A. Where existing fencing is indicated to be reset or relocated, remove existing concrete footings from posts and dispose of off the site. Construct new concrete footings, as specified, in their designated location. Replace all parts of fencing that are broken or damaged during removing and rein-stalling work with new parts as specified to complete reinstallation. New materials shall closely match design of existing installation. Top rail will be required in reinstalled fencing which does not have top rail in its existing condition. Install as specified for new installations.

B. Existing fences shall be reset where finish pavement is raised or lowered more than 6" from existing grade. Remove and reinstall entire fence assembly as specified.

3.06 FENCING ADJUSTMENTS

A. Where the finish grade is raised 6" or less, cut and re-knuckle the existing fence fabric. Adjust tension wire and tie to fabric.

B. Where the finish pavement is lowered 6" less, chip/off the fence footing flush with the finish grade and adjust the fabric and its attachments.

C. Post footings and fabrics previously shortened and needing readjustment shall be entirely replaced.

3.07 INSTALLATION OF GATES

A. Provide gates of the sizes indicated on Drawings. Allow clearance on gates of 1-1/2" at bottom and 1" at top. Construct gates set in sloping areas to conform to the grade. Provide an opening in each gate for access to locking device or padlock. Knuckle ends of fabric cut for opening to eliminate hazards.

B. Sliding Gates and Swing Barricade Gates: Construct and install as indicated on Drawings.

3.08 RE-FENCING

A. Fabric Removal: Do not remove more than what can be replaced during one day unless a barricade, providing equal security, will be installed in its place.

B. Post and Rails: Bent post must be straightened and cut if necessary to no less than 18" height above grade. All rails and accessories shall be replaced. After straightening and cutting the post, if necessary, install new pre-galvanized sleeve and attach with either welding or bolting.

C. Painting:

1. Preparation: Prepare exposed steel posts, ails and accessories thoroughly cleaned of rust, oil and foreign materials. Painted galvanized metal shall be stripped to bare metal before applying prime coat.
2. Priming: Spot prime areas from which the original surface coating had been removed with a metal primer to match adjoining surfaces. Subsequently, install a prime coat to the entire surface to be painted.
3. First Coat: Install first coat as recommended by the paint manufacturer. Furnish a color that is 10 percent to 15 percent lighter or darker than the finish coat.
4. Second or Finish Coat: Install finish coat after the first coat has cured.
5. Use any of the following paints and in accordance with the manufacturer's written recommendations.
    i. Caroline Carbomastic 15
    ii. "Galvalloy", distributed by Metalloy Products Company, Newport Beach, CA.
    iii. or approved equal

3.08 COMPLETION

A. Completed fencing shall form continuous units between points indicated with all required parts, accessories, and fittings provided and installed. Clean all exposed metal surfaces of cement, grout and other foreign substances.

B. Fill in holes left by removal of existing fence footings, except in areas where grading work is indicated or specified, to existing grade with clean earth thoroughly compacted to at least same density as adjoining soil.

3.09 SURPLUS MATERIALS DISPOSAL

A. All existing fencing, including fabric, posts, parts and fittings, removed and not reused in work, shall become property of Contractor and shall be removed from site, unless otherwise specified or noted on Drawings.

B. Dispose of off the site all surplus earth, resulting from chain link fencing work that is not used in the grading work.

END OF SECTION