PROJECT Egyptian Theatre Facade Project
City of Coos Bay, Oregon

STRUCTURAL ENGINEER

KPFF Consulting Engineers
111 SW 5th Avenue, Suite 2500
Portland, OR 97204
(503) 227-3251
Contact: Josh Richards, P.E., S.E.

ARCHITECT

Woofter Architecture
107 SE Washington St. Suite 440
Portland, OR 97214
(503) 724-0111
Contact: Miles Woofter AIA

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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.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Egyptian Theatre Facade Project

1. Project Location: 229 South Broadway, Coos Bay, Oregon 97420.

B. Owner: City of Coos Bay; 500 Central Ave. Coos Bay, Oregon 97420.

1. Owner's Representative: Josh Richards, S.E. KPFF Consulting Engineers 111 SW 5th Avenue, Suite 2500, Portland, Oregon 97204. 503-227-3251

1.3 WORK COVERED BY CONTRACT DOCUMENTS

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

1. Replacement of the main entrance canopy and marquee support

2. Replacement of the existing front façade, including new doors and windows

B. Type of Contract.

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

1.4 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Limits: Limit site disturbance, including sidewalk patching, to 6 feet (12.2 m) beyond building perimeter.
   2. Driveways, Walkways and Entrances: Keep entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

      a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.5 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

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

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

   1. Notify Owner not less than two days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to adjacent occupied properties with Owner.

   1. Notify Owner not less than two days in advance of proposed disruptive operations.
   2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 SPECIFICATION AND DRAWING CONVENTIONS

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

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

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

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

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.

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. Engineer's or Architect's Action: If necessary, Engineer and/or Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer and/or Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Engineer 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

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Engineer or Architect will consider Contractor's request for substitution when the following conditions are satisfied:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Requested substitution will not adversely affect Contractor's construction schedule.
c. Requested substitution has received necessary approvals of authorities having jurisdiction.
d. Requested substitution is compatible with other portions of the Work.
e. Requested substitution has been coordinated with other portions of the Work.
f. Requested substitution provides specified warranty.

g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Engineer will consider requests for substitution if received within 30 days after the Notice to Proceed.

1. Conditions: Engineer or Architect will consider Contractor's request for substitution when the following conditions are satisfied:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Requested substitution will not adversely affect Contractor's construction schedule.
e. Requested substitution has received necessary approvals of authorities having jurisdiction.
f. Requested substitution is compatible with other portions of the Work.
g. Requested substitution has been coordinated with other portions of the Work.
h. Requested substitution provides specified warranty.

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. Engineer or Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.3 PROPOSAL REQUESTS

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

1. Work Change Proposal Requests issued by Engineer or Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

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

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 Engineer or Architect.

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

1.4 CHANGE ORDER PROCEDURES

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

1.5 CONSTRUCTION CHANGE DIRECTIVE

A. Work Change Directive: Engineer may issue a Work Change Directive on AIA Document G714 Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 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.

   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 Engineer at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

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

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

      a. Project name and location.
      b. Name of Engineer.
      c. Engineer's project number.
      d. Contractor's name and address.
      e. Date of submittal.

   2. Arrange schedule of values consistent with format of AIA Document G703 .
   3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
   4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. 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.
7. 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.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

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

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

1.3 APPLICATIONS FOR PAYMENT

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

    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: Submit Application for Payment to Engineer by the 17th of the month. The period covered by each Application for Payment is one month, ending on the 30th.

D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703as form for Applications for Payment.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

    1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
    2. Include amounts of Change Orders and Work Change Directives issued before last day of construction period covered by application.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Schedule of unit prices.
5. Submittal schedule (preliminary if not final).
6. List of Contractor's staff assignments.
7. List of Contractor's principal consultants.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.
11. Report of preconstruction conference.
12. Certificates of insurance and insurance policies.

I. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."

6. AIA Document G707-1994, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

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, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, 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.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.

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. Engineer will return RFIs submitted to Engineer 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 Engineer.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Engineer.

D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven working days for Engineer's response for each RFI. RFIs received by Engineer 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 Engineer's actions on submittals.
   f. Incomplete RFIs or inaccurately prepared RFIs.

2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
3. Engineer'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 Engineer 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. Include the following:

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

F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work, Work 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: 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 Engineer 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 and Engineer, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than **15** days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner and Engineer; 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. Use of the premises and existing building.
k. Work restrictions.
l. Working hours.
m. Responsibility for temporary facilities and controls.
n. Procedures for moisture and mold control.
o. Procedures for disruptions and shutdowns.
p. Construction waste management and recycling.
q. Parking availability.
r. Office, work, and storage areas.
s. First aid.
t. Security.
u. 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 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.

1.2 DEFINITIONS

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

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer'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 Engineer and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

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

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

1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer 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 7days for review of each resubmittal.

C. 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 (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    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.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Engineer 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 Engineer.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return without review submittals received from sources other than Contractor.
    a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

        1) Project name.
        2) Date.
        3) Destination (To:).

4) Source (From:).
5) Name and address of Engineer.
6) Name of Construction Manager.
7) Name of Contractor.
8) Name of firm or entity that prepared submittal.
9) Names of subcontractor, manufacturer, and supplier.
10) Category and type of submittal.
11) Submittal purpose and description.
12) Specification Section number and title.
13) Specification paragraph number or drawing designation and generic name for each of multiple items.
14) Drawing number and detail references, as appropriate.
15) Indication of full or partial submittal.
16) Transmittal number.
17) Submittal and transmittal distribution record.
18) Remarks.
19) Signature of transmitter.

D. 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 Engineer.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner**,** containing the following information:

    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    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.
q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

E. Options: Identify options requiring selection by Engineer.

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

G. 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 Engineer's action stamp.

H. 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.

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

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

1. Submit electronic submittals via email as PDF electronic files.

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

2. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Engineer will return two copies.
3. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Engineer will not return copies.
4. 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. Submit Product Data before or concurrent with Samples.
5. Submit Product Data in the following format:

    a. PDF electronic file.

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

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

    a. 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 (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
3. Submit Shop Drawings in the following format:

    a. PDF electronic file.

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. Engineer will return submittal with options selected.

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

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

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

H. 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.

I. 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.

J. 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.

K. 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.

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

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

N. 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.

O. 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.

P. 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.

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

R. 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.

S. 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.

T. 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.

U. 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.

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 Engineer.

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 ENGINEER'S ACTION

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

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

C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer 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.

END OF SECTION 013300

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Engineer, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

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

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.

C. Site Plan: Indicating staging and parking areas.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel

pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

2.2 EQUIPMENT

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

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

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

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

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

B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

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

1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from

adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

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

F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
1. Connect temporary service to Owner's existing power source, as directed by Owner.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, and inspections.

H. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

I. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

J. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Temporary Signs: Provide construction sign at front entrance of the theatre to inform public and individuals seeking entrance to Project.

K. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

L. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

M. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

N. Staging: Staging as allowed at east side of theater.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

D. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

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

F. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.4 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Discard or replace water-damaged and wet material.
4. Discard, replace, or clean stored or installed material that begins to grow mold.
5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.5 OPERATION, TERMINATION, AND REMOVAL

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

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

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. Protection of installed construction.
7. Correction of the Work.

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.

1.2 QUALITY ASSURANCE

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

1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

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

3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

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, timber piles and other construction affecting the Work.

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 walls, floors, and roofs for suitable conditions where products and systems are to be installed.
2. 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. 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.

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

C. 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 Engineer 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 Engineer promptly.

3.4 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.

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

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

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

C. Temporary Support: Provide temporary support of work to be cut.

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

E. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Proceed with patching after construction operations requiring cutting are complete.

G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
2. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

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

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

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

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

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

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

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

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

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

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

3.7 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 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.

1.2 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

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 individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

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. Perform preventive maintenance on equipment used prior to Substantial Completion.
3. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
4. Complete final cleaning requirements, including touchup painting.
5. 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 10days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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 Engineer, 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 Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. 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.

B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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.

1. Organize list of spaces in sequential order, proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Submit list of incomplete items in the following format:
   a. PDF electronic file. Engineer will return annotated copy.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer 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. 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.
2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
3. 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 in areas disturbed by construction activities, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. 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.
e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
f. Sweep concrete floors broom clean in unoccupied spaces.
g. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
h. 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.
i. Remove labels that are not permanent.
j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
k. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
l. Leave Project clean and ready for occupancy.

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 024119 – SELECTIVE BUILDING DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of structures.

B. Related Sections include the following:

1. Division 1 Section "Construction Facilities and Temporary Controls" for temporary construction and environmental-protection measures.

1.2 DEFINITIONS

A. Remove:

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

B. Remove and Reinstall:

1. Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

C. Existing to Remain:

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

1.3 MATERIALS OWNERSHIP

A. Historic items, relics, and objects of interest or value to Owner that may be encountered during selective demolition remain Owner's property.

1. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner's Authorized Representative.

1.4 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.

2. Interruption of utility services, including how long utility services will be interrupted.

3. Use of existing stairs.

4. Locations of proposed dust-and noise-control devices, and temporary means of egress.

5. Means of protection for items to remain and items in path of waste removal from structures.

B. Inventory:

1. Include for each item the location for its reinstallation.

C. Predemolition Visual Records:

1. If requested by Owner's Representative at Predemolition Conference, provide predemolition visual record as follows:

a. Show existing conditions of adjoining construction and site improvements, including finished surfaces that might be misconstrued as damage caused by selective demolition operations.

b. Submit before Work begins.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with:

a. Governing EPA notification regulations before beginning selective demolition.

b. Hauling and disposal regulations of authorities having jurisdiction.

B. Predemolition Conference:

1. Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

2. Review:

a. Requirements of work performed by other trades that rely on substrates exposed by selective demolition.

b. Areas where existing construction is to remain and requires protection.

1.6 PROJECT CONDITIONS

A. Notify Engineer and Owner's Authorized Representative of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Hazardous Materials:

1. It is unknown if hazardous materials will be encountered in the Work.

2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Owner's Representative.

3. Hazardous material will be removed by the owner under a separate contract.

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

D. Utility Service:

1. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

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

1.7 WARRANTY

A. Existing Warranties:

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions to determine extent of selective demolition required.

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

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered:

1. Investigate and measure the nature and extent of conflict.

2. Promptly submit a written report to Owner's Authorized Representative.

E. Survey of Existing Conditions:

1. Record existing conditions by use of preconstruction visual records indicated in Article 1.4 C above.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems:

1. Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
2. Comply with requirements for existing services/systems interruptions specified in Division 1 Sections:
   a. "Summary."
   b. "Temporary Facilities and Controls."

B. Service/System Requirements:

1. Locate, identify, disconnect, and protect indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
2. Arrange to shut off indicated utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition:
   a. Provide temporary services/systems that bypass area of selective demolition.
   b. Maintain continuity of services/systems to other parts of structure.
   c. Identify items to be salvaged and reinstalled.

3.3 PREPARATION

A. Temporary Facilities:

1. Provide temporary protection to prevent injury to people and damage to adjacent facilities to remain.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1 Section "Temporary Facilities and Controls."

B. Temporary Shoring:

1. Provide and maintain structural supports required to:
   a. Preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain.
   b. Prevent unexpected or uncontrolled movement or collapse of construction being demolished.

2. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITON, GENERAL

A. General:

1. Demolish and remove existing construction only to the extent required by new construction and as indicated.
2. Use methods required to complete the Work within limitations of governing regulations and as follows:
   a. Complete selective demolition operations above each floor before disturbing supporting members on the next lower level.
   b. Neatly cut openings and holes plumb, square, and true to dimensions required.
   c. Use cutting methods least likely to damage construction to remain, or adjoining construction.
   d. Temporarily cover openings to remain.
   e. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   f. Do not use cutting torches.
   g. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   h. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   i. Do not impose excessive loads on supporting walls, floors, or framing.
   j. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning.
   a. Identify contents of containers.
3. Provide secure storage for items removed for salvage and reinstallation.
4. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition.
2. Pack or crate items after cleaning and repairing.
   a. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in their original locations as noted in visual records and written inventory specified in This Section.
   a. Comply with installation requirements for new materials and equipment.
   b. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain:

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

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete:

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

B. Masonry:

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

C. Roofing:

1. Remove no more existing roofing than can be covered in one day by new roofing.
2. Maintain building interiors watertight and weathertight.
3. See Division 7 sections specifying new roofing for substrate requirements.
4. Remove existing flashings, copings, and roof accessories.
5. Remove existing roofing system down to substrate.

D. Interior Finish Materials:

1. Should hazardous materials be encountered during demolition operations, cease work in the area where such materials are found and immediately notify the Owner in writing.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General:

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

B. Burning: Do not burn demolished materials.

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

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations.

B. Return adjacent areas to condition existing before selective demolition operations began.

3.8 SELECTIVE DEMOLITION SCHEDULE

A. Schedule of the following by Owner's Representative:

1. Existing Items to Be Removed.
   a. Roofing and flashing, where indicated.
   b. Wall and ceiling coverings within Area of Work not abated in place
   c. Other items as directed by Engineer or Owner's Authorized Representative

2. Existing Items to Be Removed, Reconditioned, and Reinstalled.
   a. Standing and running trim, including door frames, within Area of Work.
   b. Wood base within Area of Work
   c. Other items as directed by Engineer or Owner's Authorized Representative

3. Existing Items to Be Removed and Reinstalled.
   a. Lights.
   b. Wall-mounted equipment in usable condition.

END OF SECTION 024119

SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Structural steel.
2. Grout.

B. Related Sections include the following:

1. Section 014000 "Quality Requirements" for independent testing agency procedures and administrative requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.4 SUBMITTALS

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

B. Shop Drawings: Show fabrication of structural-steel components.

1. Structural steel shop drawings shall contain sufficient detail and information to allow complete fabrication and erection of the structure without reference to the contract drawings either on the fabrication shop floor or at the project site. The steel detailer shall generate all shop drawing fabrication and installation details from the structural and architectural drawings and specifications. The use of reproductions or photocopies of the contract drawings shall not be permitted.
    a. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
    b. Include embedment drawings.
    c. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
    d. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
2. Shop drawing re-submittals shall clearly identify all revisions to previous submittals.

a. Heavy ink, clouded outlines (revision clouds) shall be drawn around revised areas of individual sheets.
b. Engineer will not review information outside of revision clouds on resubmitted drawings.

C. Welding Certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Articles to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Mill test reports for structural steel, including chemical and physical properties.

G. Product Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Tension-control, high-strength bolt-nut-washer assemblies.
3. Shop primers.
4. Nonshrink grout.

H. Source quality-control test reports.

I. Certified Manufacturer's Test Reports.

J. Written Welding Procedure Specifications (WPSs): In accordance with AWS D1.1 requirements for each welded joint proposed for use whether prequalified or by testing. Include all welding that will be performed during fabrication (shop) and installation/erection (field) Include the following items as applicable for the welding process:

1. Indicate as-detailed configuration, and the maximum and minimum fit-up configurations.
2. Identify specific electrode and manufacturer.
3. List actual values of welding parameters to be used so clear instruction is provided to welders.
4. Steel specification(s) and grade(s) to be welded.
5. Thickness range of materials to be joined.
6. Type of joint.
7. Type of weld.
8. Size of weld.
9. Position of welding.
10. Flux and shielding gas.
11. Electrode diameter.
12. Voltage (except SMAW).
13. Current (amperage) or wire feed speed.
14. Travel speed.
15. Minimum Preheat and Interpass Temperatures: Provide minimum preheat and interpass temperature for all welds, including tack welds, in accordance with AWS D1.1, Table

3.2. The Contractor may specify higher minimum temperatures as a part of the WPS. Preheat and interpass temperatures lower than those required by AWS D1.1, Table 3.2, are permitted provided the WPS has been qualified by testing. Minimum preheat and interpass temperatures shall be verified at a distance of 3 inches from the joint or for materials over 3 inches in thickness at a distance equal to the thickness of the part.

16. Maximum Preheat and Interpass Temperatures: The maximum preheat and interpass temperature permitted is 550 degrees F, measured at a distance of 1 inch from the joint. This maximum temperature may not be increased with or without qualification testing.
17. Number and placement of passes.
18. Technique (stringer or weave bead).
19. Shielding gas flow rate.
20. Other pertinent information specific to the weld.

K. Procedure Qualification Record (PQR): In accordance with AWS D1.1 for all procedures qualified by testing.

L. Manufacturer's Certifications: For all welding electrodes, fluxes, and shielding gasses to be used. Certifications shall satisfy the applicable AWS A5 requirements.

M. Test Reports: Copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.

N. Design Calculations: Submit design calculations, bearing the seal and signature of a Professional Engineer, employed by the Contractor and registered in the state of the project, for the following:

1. Connections that differ from that indicated in the contract documents.
2. Requests for substitution of member sizes or material grades.
3. Modification of the strength or configuration of structural framing for the convenience to accommodate the erection sequence, construction equipment, and/or material availability.

O. Maintain one copy of each document on-site.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: The installer shall have at least five years experience in this size and type of structure.

B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD (standard for building structures).

1. Fabricator shall be registered with and approved by authorities having jurisdiction.

C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

D. Welding Standards: Comply with applicable provisions and qualify procedures and personnel according to AWS D1.1, “Structural Welding Code-Steel”, and ASW D1.8, “Structural Welding Code – Seismic Supplement” for members part of the SLRS.

1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
2. Qualifications for Welding Work: Qualify welding personnel in accordance with AWS D1.1, "Qualification," (or approved equal).
   a. Qualify welders in accordance with AWS D1.1 for each process, position, and joint configuration.
   b. Welders who have not used the welding process for a period of 6 or more months shall be recertified.
   c. If recertification of welders is required, retesting will be the Contractor's responsibility.
   d. WPSs for each joint type shall indicate proper AWS qualification and be available where welding is performed.
   e. Welders whose work fails to pass inspection shall be requalified before performing further welding.

E. Comply with applicable provisions of the following specifications and documents:

1. AISC 303 "Code of Standard Practice for Steel Buildings and Bridges" (with exceptions noted in Part 1 of this Section).
2. AISC 360 "Specification for Structural Steel Buildings, 13th edition.
3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
4. ASTM A 6 (ASTM A 6M) "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use.”

F. Professional Engineer Qualifications: A structural engineer who is licensed in the State of Oregon and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.

2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.8 EXCEPTIONS TO AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES

A. Add the following paragraph to Section 1.8.1 of the AISC Code of Standard Practice for Steel Buildings and Bridges:

"The Contractor shall have sole responsibility for site safety. The Fabricator and Erector shall review the Contract Documents and if the structure, as shown on those documents, is in conflict with the requirements of any safety regulations, the Fabricator shall notify the Structural Engineer of Record prior to commencing shop drawing production. If the Fabricator and/or Erector fail to notify the Structural Engineer of Record, as stated above, they shall become responsible for all costs for correcting such conflicts with the requirements of any and all safety regulations."

B. Add the following paragraph to Sections 7.5.1 **AND** Section 7.5.3 of the AISC Code of Standard Practice for Steel Buildings and Bridges:

"The Owner's Designated Representative for Construction shall prepare the Embedment Drawing. The Embedment Drawing shall be submitted to the Structural Engineer of Record for information only. The Structural Engineer of Record shall not be responsible for the review and approval of the Embedment Drawing."

C. Add the following paragraph to Section 7.10.3 of the AISC Code of Standard Practice for Steel Buildings and Bridges:

"The Erector shall have the sole responsibility for determining the means and methods used to properly and adequately brace the framing during erection."

D. Revise the second paragraph of Section 7.10.3 of the AISC Code of Standard Practice for Steel Buildings and Bridges as follows:

"The Erector need not consider loads during erection that result from the performance of work by, or the acts of, others, except as specifically identified by the Owner's Designated Representatives for Design and Construction, nor those that are unpredictable, such as loads due to hurricane, tornado, ~~**earthquake,**~~ explosion or collision. **The Erector shall determine, furnish**

and install temporary supports to resist earthquake loads specified by the 2006 International Building Code for new buildings."

E. Revise Section 7.14 of the AISC Code of Standard Practice for Steel Buildings and Bridges as follows:

"The correction of minor misfits by moderate amounts of reaming **or** grinding, ~~**welding or cutting**~~, and the drawing of elements into line with drift pins, shall be considered to be normal erection operations. Errors that cannot be corrected using the foregoing means, or that require ~~**major**~~ **welding, cutting or** changes in member or Connection configuration, shall be promptly reported to the Owner's Designated Representatives for Design and Construction and the Fabricator by the Erector, to enable the responsible entity to either correct the error or approve the most efficient and economical method of correction to be used by others."

Particular note shall be paid to the commentary for this section of the AISC Code of Standard Practice for Steel Buildings and Bridges, which reads as follows:

"As used in this Section, the term "moderate" refers to the amount of reaming, grinding, welding or cutting that must be done on the project as a whole, not the amount that is required at an individual location. It is not intended to address limitations on the amount of material that is removed by reaming at an individual bolt hole, for example, which is limited by the bolt-hole size and tolerance requirements in the AISC and RCSC Specifications."

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

B. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than the following:

1. Channels, Angles, M, S-Shapes: 60 percent.
2. Plate and Bar: 25 percent.
3. Cold-Formed Hollow Structural Sections: 25 percent.
4. All Other Steel Materials: 25 percent.

C. Structural Steel Shapes and Bars: Refer to the General Structural Notes.

D. Channels, Angles: Refer to the General Structural Notes.

E. Plate and Bar: Refer to the General Structural Notes.

F. Cold-Formed Hollow Structural Sections: Refer to the General Structural Notes.

G. Welding Electrodes: Comply with AWS requirements.

1. Welding electrodes shall have a minimum tensile strength of 70 ksi using AWS A5 classification test.
2. Welding filler metals, as supplied by the manufacturer, shall meet the requirements for H16 (16 mL diffusible hydrogen per 100 grams deposited weld metal) as tested using the mercury or gas chromatograph method as specified in AWS A4.3, "Standard Methods for Determination of Diffusible Hydrogen Content of Martensitic, Bainitic, and Ferritic Steel Weld Metal Produced by Arc Welding." The manufacturer's Certificate of Conformance shall be considered adequate proof that the supplied electrodes meet this requirement, and no additional testing of filler metal samples or of production welds is required.
3. All low hydrogen electrodes shall be stored, handled, protected from atmospheric exposure and redried, if required, per AWS D1.1, 5.3.
4. FCAW electrodes shall be received in moisture-resistant packages that are undamaged. They shall be protected against contamination and injury during shipment and storage. Electrode packages shall remain effectively sealed against moisture until the electrode is required for use. When removed from the protective packaging and installed on machines, care shall be taken to protect the electrodes and coatings, if present, from deterioration or damage. Modification or lubrication of an electrode after manufacture for any reason is not permitted, except drying shall be permitted when recommended by the manufacturer.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

B. Headed Anchor Rods: ASTM F 1554, Grade 36 straight.

1. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
4. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

C. Threaded Rods: ASTM A 36/A 36M.

1. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
2. Washers: ASTM A 36/A 36M carbon steel.
3. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

2.3 PRIMER

A. Primer: SSPC-Paint 25, Type I or II, zinc oxide, linseed oil, and alkyd.

B. Galvanizing Repair Paint: ASTM A 780.

2.4 GROUT

A. Nonmetallic, Non-Shrink Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" (with exceptions noted in Part 1 of this Specification Section).
   1. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
   2. Mark and match-mark materials for field assembly.
   3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Re-Entrant Corners: Provide ½-inch radius at all re-entrant corners, unless noted otherwise.

C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

D. Bolt Holes: Cut, drill, or punch bolt holes perpendicular to metal surfaces.

E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

F. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning and SSPC-SP 3, "Power Tool Cleaning."

G. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.

   1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
   2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

H. Exposed Structural Steel: For structural steel exposed at interior and exterior locations.

   1. Fit and shop assemble items in largest practical sections for delivery to site.
   2. Fabricate items with joints tightly fitted and secured.
   3. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting rust, scale, seam marks, roller marks, rolled trade names, and roughness.
   4. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating and shop priming.
   5. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.6 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

B. Erection Connections, etc: Place holes, plates, or other attachments required by the Erector so as not to interfere with or cause any other detrimental effect to structural members or their connections. Holes and attachments are not permitted in the "protected zone" as described in Section 1.3 and defined in the drawings.

C. Exposed Steel Shop Connections:

1. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small, uniform radius.
2. Continuously seal joined members by intermittent (stitch) welds and plastic filler.
3. Verify that weld sizes, fabrication sequence, and equipment used will limit distortions to allowable tolerances. Prevent weld show-through.
4. Exposed mechanical fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where noted otherwise.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces to be field welded.
2. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 14/NACE No. 8, "Industrial Blast Cleaning."

C. Exposed Steel Surface Preparation: Clean surfaces of exposed structural steel to the following specifications and standards:

1. SSPC-SP6, "Commercial Blast Cleaning".

D. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

E. Painting: Prepare steel and apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

2.8 DIMENSIONAL TOLERANCES

A. Fabrication Tolerances: Unless otherwise noted, fabricate structural members to referenced AISC Specifications for allowable tolerances.

2.9 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth
2. Materials for galvanizing shall be geometrically suitable for galvanizing as specified in ASTM A384 and A385. For built-up members, assemblies shall be fabricated as required to limit warping and distortion.

B. Steel that will be finished by hot dip galvanizing shall have controlled silicon and phosphorus contents. The silicon content shall be in either of the ranges 0 – 0.04% or 0.15% – 0.25%, the phosphorus content shall be below 0.04%. Before galvanizing, submit mill test certificates verifying silicon and phosphorus contents to the Architect and galvanizer.

C. Bolts, nuts and washers, and iron and steel hardware components shall be galvanized by the hot-dip process in accordance with ASTM A 153.

D. Surface Preparation: Steel shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter: Clean steel in accordance with Steel Structures Painting Council (SSPC) SSPC-SP-6, “Commercial Blast Cleaning.”

E. Coating Requirements

1. Weight: The weight of the galvanized coating shall conform to Table 2 of ASTM A 123 or Table 1 of ASTM A 153, as appropriate.
2. Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible, and free from any defect that is detrimental to the stated end use of the coated article.
    a. Determine the integrity of the coating by visual inspection and coating thickness measurements.
    b. Where slip factors are required for slip-critical connections, these shall be obtained after galvanizing by suitable treatment of the faying surfaces in accordance with the latest edition of the Specification for Structural Joints Using ASTM A 325 or A 490 bolts as approved by the Research Council on Structural Connections of the Engineering Foundation.
3. Adhesion: The galvanized coating shall be sufficiently adherent to withstand normal handling during transport and erection.

F. Touch-Up and Repair

1. Mechanical Damage: Repair areas damaged by welding; flame cutting; or during handling, transport, or erection in accordance with ASTM A 780 by one of the following methods:
   a. Zinc-Based Solder: In accordance with ASTM A 780, Annex A1.
      1) Apply the zinc-based solder in a minimum thickness of 4 mils (3 mils for material less than 1/4-inch thick).
      2) Verify coating thickness by measurements with a magnetic or electromagnetic gauge.
2. Wet Storage Stain
   a. Remove any wet storage stain if formed and discovered prior to leaving the galvanizer's plant unless late pick up or acceptance of delivery has necessitated the material being stored in unfavorable conditions. Remove wet storage stain before installation so that premature failure of the coating will not occur. Remove wet storage stain as follows:
      1) Arrange the object so that their surfaces dry rapidly.
      2) Remove light deposits by means of a stiff bristle (not wire) brush. Heavier deposits are to be removed by brushing with a 5 percent solution of sodium or potassium dichromate with the addition of 0.1 percent by volume of concentrated sulfuric acid. Apply with a stiff bristle brush, and leave for approximately 30 seconds before thoroughly rinsing and drying.
      3) Alternatively, a proprietary product, such as Oakite Highlite or equal, which is intended for this purpose, may be used according to manufacturer's recommendations.
      4) Check coating thickness in the affected areas to ensure that the zinc coating remaining after the removal of wet storage stain is sufficient to meet or exceed the requirements of the specification.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 "Code of Standard Practice for Steel Buildings and Bridges" with exception noted in Part 1 of this Specification Section, and AISC 360 “Specification for Structural Steel Buildings”..

B. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base plates. Clean bottom surface of base plates.

1. Set base plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of base plate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and base plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

D. Splice members only where indicated.

E. Do not use thermal cutting during erection.

F. Do not enlarge unfair holes in members by burning or using drift pins.

G. Reaming: Light drifting will be permitted to draw the parts together, but drifting to match unfair holes will not be permitted. Any enlargement of holes necessary to make connections in the field shall be done by reaming with twist drills, care being taken not to weaken the adjoining metal. If, in the judgement of the Engineer/Architect, the extent of the reaming is such that holes cannot be properly filled or accurately adjusted after reaming, the faulty member shall be discarded and replaced with a new one, and all costs and expenses resulting therefrom shall be paid by the Contractor.

H. Cutting and Fitting: No cutting of sections, either flanges, webs, stems or angles shall be done by the Contractor without the consent of the Engineer/Architect, unless this cutting is particularly specified or shown on the drawings

I. Corrective Measures

1. Any errors in locations or inaccuracies in the setting of anchor bolts, base plates, or other items of attachment or support for steel work shall be reported to the Engineer, and shall be corrected in a manner subject to the approval of the Engineer.
2. Any misfits due to errors in fabrication shall be reported immediately to the Engineer, along with proposed method of correction of same and Engineer approval obtained before proceeding with corrective measures.

3. No members shall be cut or burned without specific approval in writing.
4. Bolted or welded connections, joints, or fastenings, which are classified as defective in the opinion of the Engineer, shall be corrected by the Contractor in a manner subject to the Engineer's approval.

3.4 FIELD CONNECTIONS

A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" (with exceptions noted in Part 1 of this Specification Section) for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. FCAW electrodes shall be protected from atmospheric exposure as follows:
   a. Electrodes not consumed within 24 hours of accumulated exposure outside closed or heated storage shall not be used for seismic critical welds.
   b. Electrode spools shall be identified and monitored for total atmospheric exposure time. Electrodes that have been exposed for periods exceeding an accumulated 24 hours may be dried when manufacturer's recommendations show that drying is effective at removing moisture and restoring electrodes to their designated diffusible hydrogen level. Dry as specified by the manufacturer. If the electrode or the electrode spool is damaged by baking, the electrode shall not be used.
3. Each Welder working on the project shall be assigned an identification symbol or mark. Each Welder shall mark or stamp this identification symbol at each weldment completed and inspected by the welder. Stamps, if used, shall be low-stress type. All welds shall be marked or stamped.

B. Erection Connections, etc: Place holes, plates, or other attachments required by the Erector so as not to interfere with or cause any other detrimental effect to structural members or their connections. Holes and attachments are not permitted in the "protected zone" as described in Section 1.3 and defined in the drawings.

C. Exposed Steel Field Connections:

1. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small, uniform radius.
2. Continuously seal joined members by intermittent (stitch) welds and plastic filler.
3. Verify that weld sizes, fabrication sequence, and equipment used will limit distortions to allowable tolerances. Prevent weld show-through.
4. Exposed mechanical fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where noted otherwise.
5. Remove erection bolts; fill holes with plug welds and grind smooth.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections and tests and to prepare test reports in accordance with "Testing and Inspection" Article 3.6 below.

3.6 TESTING AND INSPECTION

A. All structural steel work is subject to special inspection. Testing Agency and Inspector Requirements:.

1. Special Inspector: Testing Agency shall provide qualified "Special Inspector" who will perform the inspection services.
2. Testing agency will conduct and interpret tests, and state in each report whether test specimens comply with or deviate from requirements.
3. Testing agency will notify the Owner and Engineer immediately of discrepancies in the work which are time-critical or affect the construction progress.
4. Inspector will:
   a. Verify material identification.
   b. Verify bolt tightening.
   c. Inspect welding.

B. Fabrication Inspection: When approved by the Building Official, the Owner, and Engineer, full-time special inspection in the fabrication shop by the Owner's Testing Agency may be waived, subject to the following:

1. The Fabricator participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant.
2. All shop inspection is provided by the Contractor, per the requirements herein, and is documented. Reports and test results are to be available for the Owner's Inspector to review.
3. Periodic inspection by the Owner's Inspection Agency is allowed by the Fabricator.
4. Certified Plants: Continuous plant inspection is not required at plants producing prefabricated steel products which are certified by the Building Official.

C. Contractor Responsibilities Related to Shop and Field Inspections:

1. Maintain complete records of all quality control and testing performed by the Contractor.
2. Furnish all electrical power, turning or moving of members, hoisting, staging, and other facilities required for inspection.
3. Provide testing agency with access to places where structural steel work is being fabricated or erected so required inspection and testing can be accomplished.
4. Correct deficiencies in, or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
5. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.
6. Grant Inspectors full authority to inspect all material and work that fails to conform in every respect to these specifications.
7. When required by Engineer or Owner’s Independent Testing Agency or Contractor’s engaged inspection organization, make adequate platforms available to the Inspector for the purpose of checking high-strength bolts and welds. Scaffolding shall be provided to ensure safe performance of this operation.

D. Shop and Field Tests and Inspections

1. Welded Connections: In addition to visual inspection, welded connections will be tested and inspected as required by the Contract Documents and Specifications, according to AWS D1.1. Inspection procedures at Testing Agency's option, are listed below:
   a. Procedures
      1) Liquid Penetrant Inspection: ASTM E 165.
      2) Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
      3) Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
      4) Ultrasonic Inspection: ASTM E 164.
   b. Inspector shall:
      1) Verify Welding Procedure Specifications (WPSs) sheet has been provided and has been reviewed with each welder performing the weld. Welds not executed in conformance with the WPSs are rejectable.
      2) Verify fit-up meets tolerances of WPSs and mark joint prior to welding.
      3) Verify welding consumables per WPSs.
      4) Verify welding qualification and identifications.
      5) Observe preheat and interpass temperatures, and weld pass sequence for conformance with WPSs.
      6) All partial penetration, fillet, and other remaining welds shall be visually inspected.
      7) Where ultrasonic testing is performed, the entire weld shall be tested.

3.7 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with zinc-based solder according to ASTM A 780 and manufacturer's written instructions. At a minimum, the repair material thickness shall match that of the existing coating.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting structural steel.

   1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
   2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Section.

END OF SECTION 051200

SECTION 061000 - ROUGH CARPENTRY

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. Framing with dimension lumber.
2. Framing with timber.
3. Roof sheathing panels.
4. Wood blocking and nailers.
5. Wood furring.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.

B. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. RIS: Redwood Inspection Service.
4. SPIB: The Southern Pine Inspection Bureau.
5. WCLIB: West Coast Lumber Inspection Bureau.
6. WWPA: Western Wood Products Association.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Expansion anchors.
3. Metal framing anchors.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

B. Maximum Moisture Content of Lumber: 19 percent.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: Standard, Stud, or No. 3 grade, unless noted otherwise on the drawings.

1. Application: All interior partitions.
2. Species:
   a. Hem-fir (north); NLGA.
   b. Hem-fir; WCLIB, or WWPA.

B. Load-Bearing Partitions: No. 2 grade, unless otherwise noted on the drawings.

1. Application: Interior load-bearing partitions.
2. Species:
   a. Hem-fir (north); NLGA.
   b. Douglas fir-larch; WCLIB or WWPA.
   c. Hem-fir; WCLIB or WWPA.
   d. Douglas fir-larch (north); NLGA.

C. Ceiling Joists: Construction or No. 2 grade, unless noted otherwise on the drawings.

1. Species:
   a. Hem-fir (north); NLGA.
   b. Douglas fir-larch; WCLIB or WWPA.
   c. Douglas fir-larch (north); NLGA.
   d. Hem-fir; WCLIB or WWPA.
   e. Western woods; WCLIB or WWPA.

D. Joists, Rafters, and Other Framing Not Listed Above: No. 2 grade, unless noted otherwise on the drawings.

1. Species:
   a. Hem-fir (north); NLGA.
   b. Douglas fir-larch; WCLIB or WWPA.
   c. Douglas fir-larch (north); NLGA.

2.4 TIMBER FRAMING

A. Provide timber framing complying with the following requirements, unless noted otherwise on the drawings, according to grading rules of grading agency indicated:

1. Species and Grade: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; No. 1 grade; NLGA, WCLIB, or WWPA.
2. Species and Grade: Hem-fir or hem-fir (north); No. 1 grade; NLGA, WCLIB, or WWPA.

3. Maximum Moisture Content: 20 percent.

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.

B. For items of dimension lumber size, provide Construction or No. 2 and the following species:

1. Hem-fir (north); NLGA.
2. Hem-fir; WCLIB or WWPA.
3. Western woods; WCLIB or WWPA.
4. Northern species; NLGA.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 ROOF SHEATHING

A. Plywood Panels: Structural 1 in thickness indicated.

1. Span rating: Not less than 24/0.

2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Wood Screws: ASME B18.6.1.

D. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

E. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

F. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.8 METAL FRAMING ANCHORS

A. Basis-of-Design Product: Subject to compliance with substitution requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Phoenix Metal Products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

D. Roof Sheathing: Install roof sheathing panels to comply with manufacturer's written instructions.

E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Do not splice structural members between supports unless otherwise indicated.

G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WALL AND PARTITION FRAMING INSTALLATION

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.

1. For interior partitions and walls, provide 2-by-4-inch nominal- (38-by-89-mm actual-) size wood studs spaced 24 inches (610 mm) o.c. unless otherwise indicated.
2. Provide continuous horizontal blocking at midheight of partitions more than 96 inches (2438 mm) high, using members of 2-inch nominal (38-mm actual) thickness and of same width as wall or partitions.

B. Construct corners and intersections with three or more studs, except that two studs may be used for interior non-load-bearing partitions.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal (89-mm actual) depth for openings 48 inches (1200 mm) and less in width, 6-inch nominal (140-mm actual) depth for openings 48 to 72 inches (1200 to 1800 mm) in width, 8-inch nominal (184-mm actual) depth for openings 72 to 120 inches (1800 to 3000 mm) in width, and not less than 10-inch nominal (235-mm actual) depth for openings 10 to 12 feet (3 to 3.6 m) in width.

3.4 FLOOR JOIST FRAMING INSTALLATION

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on masonry. Attach floor joists as follows:

1. Where supported on wood members, by toe nailing or by using metal framing anchors.
2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.

B. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches (76 mm) and do not embed more than 4 inches (102 mm).

C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).

D. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches (50 mm) from top or bottom.

E. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at ends of joists unless nailed to header or band.

F. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches (102 mm) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.

G. Anchor members paralleling masonry with 1/4-by-1-1/4-inch (6.4-by-32-mm) metal strap anchors spaced not more than 96 inches (2438 mm) o.c., extending over and fastening to three joists. Embed anchors at least 4 inches (102 mm) into grouted masonry with ends bent at right angles and extending 4 inches (102 mm) beyond bend.

H. Provide solid blocking between joists under jamb studs for openings.

I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.

J. Provide bridging of type indicated below, at intervals of 96 inches (2438 mm) o.c., between joists.

1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal- (19-by-64-mm actual-) size lumber, double-crossed and nailed at both ends to joists.
2. Steel bridging installed to comply with bridging manufacturer's written instructions.

3.5 TIMBER FRAMING INSTALLATION

A. Install timber with crown edge up and provide not less than 4 inches (102 mm) of bearing on supports. Provide continuous members unless otherwise indicated; tie together over supports as indicated if not continuous.

B. Install wood posts using metal anchors indicated.

3.6 PROTECTION

A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061600 - SHEATHING

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. Wall Sheathing.

2. Roof sheathing.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Sustainability Submittals:

1. Certificates for chain-of-custody certificates indicating that products specified to be made from certified wood comply with forest certification requirements. Include

documentation that manufacturer is certified for chain of custody by an FSC-accredited certification body. Include statement indicating cost for each certified wood product.

2. Product Data: for adhesives, documentation including printed statement of VOC content.
3. Product Data for composite wood products, documentation indicating that product contains no urea formaldehyde.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For following products, from ICC-ES:

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS

A. Emissions: Products shall 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."

B. Certified Wood: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":

1. Plywood.

C. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.

D. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

E. Factory mark panels to indicate compliance with applicable standard.

2.2 WALL SHEATHING

A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

1. Products: Subject to compliance with requirements, **provide one of the following**:

a. CertainTeed Corporation; GlasRoc.
b. G-P Gypsum Corporation; Dens-Glass Gold.
c. National Gypsum Company; Gold Bond e(2)XP.
d. Temple-Inland Inc.; GreenGlass
e. United States Gypsum Co.; Securock.

2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick.
3. Size: 48 by 96 inches (1219 by 2438 mm) for vertical installation.

2.3 ROOF SHEATHING

A. Plywood Roof Sheathing: Exposure 1, Structural I sheathing.

1. Span Rating: Not less than 24/0.
2. Nominal Thickness: Not less than 1/2 inch (13 mm).

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.5 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants.

B. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

2.6 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

D. Coordinate roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

E. Coordinate wall and sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Wall and Roof Sheathing:
   a. Screw to cold-formed metal framing.
   b. Space panels 1/8 inch (3 mm) apart at edges and ends.

3.3 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to wood framing with screws.
2. Install boards with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
3. Install boards with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.
2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

D. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600

SECTION 07 2100 - THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Batt insulation and vapor retarder within exterior wall construction.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 – Rough Carpentry: Wall framing.

B. Section 07 2500 - Weather Barriers: Air barrier.

C. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation at gypsum board assemblies.

1.03 REFERENCE STANDARDS

A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

D. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C.

1.04 SUBMITTALS

A. Refer to Section 01 3323 - Submittals, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.06 SEQUENCING

A. Sequence work to ensure fireproofing and firestopping materials are in place before beginning work of this section.

1.07 COORDINATION

A. Coordinate the work with Section 07 2500 for installation of air seal materials.

PART 2 PRODUCTS

2.01 GENERAL

A. All insulation must have Greenguard certification to the level of Indoor Air Quality Certified. This includes insulation of air handling equipment insulation, mechanical equipment insulation and building (wall and roof) insulation. Insulation product types which lack Greenguard certified options are excluded from this requirement, including extruded board and fiber board insulation.

2.02 APPLICATIONS

A. Framing Cavity Insulation in Exterior Walls at New Building: Batt insulation with separate vapor retarder.

2.05 BATT INSULATION MATERIALS

A. For Framed Exterior Wall and Soffit Construction in New Building: As indicated on Drawings.

B. Additionally: For filling perimeter window and door shim spaces and crevices in exterior wall and roof; as indicated on Drawings.

C. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.

1. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
2. Formaldehyde, phenol, acrylics and artificial colors content: Zero.
3. Thermal Resistance: R of 3.1 per inch of thickness. Provide overall minimum R-18 unless otherwise indicated.
4. Thermal Resistance: To meet Code and Mechanical requirements.
5. Facing: Unfaced.
6. Recycled Content: 30% minimum, post-consumer.
7. Basis-of-Design Products:
    a. Textrafine Insulation by ANCO Products, Inc: www.ancoproductsinc.com.
    b. EcoBatt insulation by Knauf Insulation GmbH: www.knaufinsulation.us.

c. CertainTeed Corporation: www.certainteed.com.

d. Guardian Fiberglass: www.guardianfiberglass.com.

8. Greenguard Indoor Air Quality certified product required.

9. Substitutions: Subject to compliance with Project requirements; refer to Section 01 2500 - Product Substitution Procedures.

2.06 ACCESSORIES

A. Air Barrier: Specified in Section 07 2500.

B. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

C. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BATT INSULATION INSTALLATION

A. Install insulation and vapor retarder as indicated and in accordance with manufacturer's instructions; coordinate with Section 07 2500 - Weather Barriers for installation of vapor retarder.

B. Install in exterior framed wall and soffit spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. At furred framing at exterior masonry walls or other locations without sheathing at one face, retain insulation batts in place with wire mesh secured to exterior side of framing members.

F. Coordinate work of this section with requirements for vapor retarder specified in Section 07 2500.

3.03 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2500 - WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air Barriers (AB-1): Materials to stop passage of air through above-grade building envelope walls and ceilings and soffits.

B. Flexible Flashings and Elastomeric Sheet Seals: Materials to stop passage of water through above-grade joints between building envelope walls and roof, joints around frames of openings in building envelope walls, and joints between building envelope walls and ceilings and soffits.

1.02 RELATED REQUIREMENTS

A. Section 06 1600 – Sheathing. Water-resistive barrier under exterior cladding

B. Section 07 2100 - Thermal Insulation: Coordination of batt insulation in conjunction with vapor retarder.

1.03 DEFINITIONS

A. Air Barrier: Air-tight barrier, water vapor permeable and water-resistive, made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.

1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.

B. AATCC Test Method 30 - Antifungal Activity, Assessment on Textile Materials: Mildew and Rot Resistance of Textile Materials.

C. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test.

D. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

E. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

H. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

I. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.

1.05 SUBMITTALS

A. Refer to Section 01 3323 - Submittals, for submittal procedures.

B. Product Data: Provide data on material characteristics.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Manufacturer's Installation Instructions: Indicate preparation.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

A. Air Barrier (AB-1):

1. On outside surface of sheathing of building envelope walls, ceilings and soffits, use air barrier sheet, mechanically fastened type, with lapped and taped edges.

2.02 AIR BARRIER MATERIALS

A. Air Barrier Sheet, Mechanically Fastened: Spun bonded polyolefin.

1. Air Permeance: 0.004 cubic feet per square foot, maximum, when tested in accordance with ASTM E2178.
2. Water Vapor Permeance: 20 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
3. Water Penetration Resistance: Withstand a water head of 21 inches, minimum, for minimum of 5 hours, when tested in accordance with AATCC 127.
4. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 9 months weather exposure.
5. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 4 months weather exposure.

6. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 50 or less, when tested in accordance with ASTM E84.
7. Joint Tape: As recommended by barrier manufacturer and suitable to the substrate.
8. Fasteners: Large-headed, gasketed fasteners as recommended by barrier manufacturer and suitable to the substrate.
9. Products:
    a. Tyvek CommercialWrap D by DuPont: www.dupont.com.
    b. GreenGuard C2000 Building Wrap by Pactiv Corporation: greenguard.pactiv.com.
    c. Fortress Pro by Raven Industries: www.fortresspro.com.

2.03 FLEXIBLE FLASHING, SHEET SEAL, AND SELF-ADHERING UNDERLAYMENT

A. Flexible Flashing/ Sheet Seal/ Self-Adhearing Underlayment: Butyl rubber bonded to 2-mil aluminum foil, self-adhesive.

1. Thickness: 35 mil minimum.
2. Comply with ASTM D 1970.
3. Acceptable Products:
    a. Perm-A-Barrier Detail Membrane by Grace Construction Products: www.na.graceconstruction.com.
    b. Vycor V40 Self-Adhered Flashing by Grace Construction Products: www.na.graceconstruction.com.
    c. HE200AM Aluminum Metal Clad by Henry Co: www.henry.com.
    d. Covalence Adhesives, Polyken Foilastic 626-35: www.covcorp.com.

2.04 ADHESIVES

A. Mastic Adhesive : Manufacturer's standard, compatible with sheet seal and substrate, thick mastic of uniform knife-grade consistency .

B. Non-Curing Adhesive : Manufacturer's standard, compatible with sheet seal and substrate, permanently non-curing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.03 INSTALLATION

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

B. Install materials and assemblies in conjunction with materials described in other sections to provide continuous sealed barrier in the building envelope enclosure of the building.

C. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

D. Mechanically Fastened Sheets - Air Barrier on Exterior:

1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
2. Overlap seams as recommended by manufacturer but at least 6 inches.
3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
4. Seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
5. Where stud framing rests on concrete or masonry, extend lower edge of sheet at least 4 inches below bottom of framing and seal to foundation with mastic adhesive.
6. Install air barrier UNDER jamb and sill flashings.
7. Install head flashings UNDER air barrier.

E. Flexible Flashing, Self-Adhesive:

1. Install over surface surrounding openings or penetrations as indicated, wrapping into opening where applicable; shingle to weather; seal laps airtight; seal to adjacent construction.
2. Install self-adhesive flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barriers and at least 6 inches up jambs. Install self-adhesive flashing over jambs covering the entire depth of framing, extending over air barrier at least 4 inches. Flashing at jambs should lap over flashing at sill and under flashing at head.
3. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
4. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
5. At junction of building envelope wall and roof install 36-inch wide flexible flashing from 24 inches up on wall, onto roof deck; shingle to weather; position laps over firm bearing.
6. At other wall and soffit penetrations, install flexible flashing surrounding penetration, lapping over adjacent Air Barrier; shingle to weather; position lap seal over firm bearing.

7. Service and Other Penetrations: Form self-adhesive flashing around penetrating item and seal to weather barrier surface; shingle to weather.

3.04 FIELD QUALITY CONTROL

A. Do not cover installed weather barriers until required inspections have been completed.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

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. Adhered thermoplastic polyolefin (TPO) roofing system.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainability Submittals:
1. Product Data for adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:

1. Base flashings and membrane terminations.
2. Roof plan showing orientation of roof deck and orientation of roofing, slope of roof, and fastening spacings.

D. Samples for Verification: For the following products:

1. Sheet roofing, of color required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.

D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

E. Field quality-control reports.

F. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed, FM Global approved for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roofing, base flashings, fasteners, cover boards, substrate board, roofing accessories, and other components of roofing system.
2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products; UltraPly TPO Membrane or comparable product by one of the following:

1. Carlisle SynTec Incorporated.
2. Cooley Engineered Membranes.
3. Custom Seal Roofing.
4. Firestone Building Products.
5. Flex Roofing Systems.
6. GAF Materials Corporation.
7. GenFlex Roofing Systems.
8. Johns Manville.
9. Mule-Hide Products Co., Inc.
10. Versico Incorporated.

C. Source Limitations: Obtain components including fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

2.3 TPO ROOFING

A. Fabric-Reinforced TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, uniform, flexible TPO sheet.

1. Thickness: 60 mils (1.5 mm), nominal.
2. Exposed Face Color: White.

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content:

    a. Plastic Foam Adhesives: 50 g/L.
    b. Gypsum Board and Panel Adhesives: 50 g/L.
    c. Multipurpose Construction Adhesives: 70 g/L.
    d. Fiberglass Adhesives: 80 g/L.
    e. Single-Ply Roof Membrane Adhesives: 250 g/L.
    f. Single-Ply Roof Membrane Sealants: 450 g/L.
    g. Nonmembrane Roof Sealants: 300 g/L.
    h. Sealant Primers for Nonporous Substrates: 250 g/L.
    i. Sealant Primers for Porous Substrates: 775 g/L.
    j. Other Adhesives and Sealants: 250 g/L.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.

C. Bonding Adhesive: Manufacturer's standard low VOC Bonding Adhesive.

D. Slip Sheet: Manufacturer's standard, of thickness required for application.

E. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick (25 mm wide by 1.3 mm thick), prepunched.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.

3.4 ADHERED ROOFING INSTALLATION

A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.

B. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.

D. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.

E. Apply roofing with side laps shingled with slope of roof deck where possible.

F. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

G. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.5 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.7 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

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

3.8 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <**Insert name of Owner**>.
2. Address: <**Insert address**>.
3. Building Name/Type: Egyptian Theatre.
4. Address: Egyptian Theatre, HWY 101, Coos Bay, Oregon 97240.
5. Area of Work: Entrance Canopy.
6. Acceptance Date: _____.
7. Warranty Period: 20 years.
8. Expiration Date: _____.

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

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

    a. lightning;
    b. peak gust wind speed exceeding <**Insert mph (m/sec)**>;
    c. fire;
    d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    f. vapor condensation on bottom of roofing; and
    g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent

said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075423

SECTION 076200 - SHEET METAL FLASHING AND TRIM

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. Manufactured reglets with counterflashing.
2. Formed roof-drainage sheet metal fabrications.
3. Formed wall sheet metal fabrications.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Sustainability Submittals:

1. Product For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

C. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 3 inches per 12 inches (1:5).

D. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested and FM Approvals approved.

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. FM Approvals Listing: Manufacture and install roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification. Identify materials with name of fabricator and design approved by FM Approvals.

D. SPRI Wind Design Standard: Manufacture and install roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:

1. Design Pressure: As indicated on Drawings.

E. Recycled Content of Steel-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 316, dead soft, fully annealed; with smooth, flat surface.

1. Finish: 2B (bright, cold rolled).

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
b. Grace Construction Products, a unit of W. R. Grace & Co.-Conn.; Grace Ice and Water Shield HT.
c. Henry Company; Blueskin PE200 HT.
d. Kirsch Building Products, LLC; Sharkskin Ultra SA.
e. Metal-Fab Manufacturing, LLC; MetShield.
f. Owens Corning; WeatherLock Specialty Tile & Metal Underlayment.
g. Polyguard Products, Inc.; Deck Guard HT.
h. Protecto Wrap Company; Protecto Jiffy Seal Ice & Water Guard HT.
i. SDP Advanced Polymer Products Inc; Palisade SA-HT.
j.

2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C) or higher.
3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as

recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

C. Solder:
1. For Stainless Steel: ASTM B 32, Grade Sn60 with acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cheney Flashing Company.
b. Fry Reglet Corporation.
c. Heckmann Building Products, Inc.
d. Hickman, W. P. Company.
e. Hohmann & Barnard, Inc.
f. Keystone Flashing Company, Inc.
g. National Sheet Metal Systems, Inc.
h. Sandell Manufacturing.

2. Material: Stainless steel, 0.019 inch (0.48 mm) thick.
3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Accessories:

a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.

5. Finish: Mill.

2.6 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

2.7 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Built-in Gutters: Fabricate to cross section required, with riveted and soldered joints, complete with end pieces, outlet tubes, and other special accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Fabricate expansion joints and accessories from same metal as gutters unless otherwise indicated.

1. Fabricate gutters with built-in expansion joints and gutter-end expansion joints at walls.

2. Accessories: Wire-ball downspout strainer.
3. Fabricate from the Following Materials:

    a. Stainless Steel: 0.016 inch (0.40 mm) thick.

B. Downspouts: Fabricate round downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Fabricated Hanger Style: Fig 1-35D according to SMACNA's "Architectural Sheet Metal Manual."
2. Fabricate from the following materials:

    a. Stainless Steel: 0.016 inch (0.40 mm) thick.

2.8 WALL SHEET METAL FABRICATIONS

A. Opening Flashings in Frame Construction: Fabricate head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:

1. Stainless Steel: 0.016 inch (0.40 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting

proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).

2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not use torches for soldering.
2. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
3. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Built-in Gutters: Join sections with riveted and soldered joints or joints sealed with sealant. Provide for thermal expansion. Slope to downspouts. Provide end closures and seal watertight with sealant.

1. Install gutter with expansion joints to exceed 50 feet (15.24 m) apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.
2. Connect downspouts to underground drainage system.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at **s**taggered 3-inch (75-mm) centers.

C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm). Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.7 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

3.8 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.9 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 085200 - WOOD WINDOWS

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 wood windows.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review, discuss, and coordinate the interrelationship of wood windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows.

B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples for Initial Selection: For units with factory-applied color finishes.

1. Include similar Samples of hardware and accessories involving color selection.

D. Samples for Verification: For wood windows and components required, prepared on Samples of size indicated below:

1. Exposed Finishes:2 by 4 inches (50 by 100 mm).

2. Exposed Hardware: Full-size units.

E. Product Schedule: For wood windows.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of wood window, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating wood windows that meet or exceed performance requirements indicated and of documenting this performance by test reports, and calculations.

B. Installer Qualifications: An installer acceptable to wood window manufacturer for installation of units required for this Project.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection, water leakage, and air infiltration.
c. Faulty operation of movable sash and hardware.
d. Deterioration of materials and finishes beyond normal weathering.
e. Failure of insulating glass.

2. Warranty Period:

a. Window: 10 years from date of Substantial Completion.
b. Glazing Units: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide Marvin Windows and Doors or comparable product by one of the following:

1. Wood Windows:

a. Crestline Windows and Doors; SNE Enterprises, Inc.
b. Hurd Windows and Doors, Inc.
c. JELD-WEN, Inc.
d. Kolbe & Kolbe Millwork Co., Inc.
e. Pella Corporation.
f. Sierra Pacific Windows.
g. Vetter.
h. Weather Shield Mfg., Inc.

C. Source Limitations: Obtain wood windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: CW.
2. Minimum Performance Grade: 30 psf.

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.32 Btu/sq. ft. x h x deg F (1.83 W/sq. m x K**)**.

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.

E. Windborne-Debris Resistance: Capable of resisting impact from windborne debris based on testing glazed windows identical to those specified, according to [**ASTM E 1886 and testing information in ASTM E 1996**] <**Insert test method**> and requirements of authorities having jurisdiction.

2.3 WOOD WINDOWS

A. Operating Types: Provide the following operating types in locations indicated on Drawings:

1. Fixed.

B. Frames and Sashes: Fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inches (51 mm) wide; water-repellent preservative treated.

1. Exterior Finish: Manufacturer's standard factory-prime coat wood.
   a. Color: As selected by Owner from manufacturer's full range.

2. Interior Finish: Manufacturer's standard factory-prime coat.
   a. Color: As selected by Architect from manufacturer's full range.

C. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.

1. Kind: Fully tempered where indicated on Drawings.

D. Insulating-Glass Units: ASTM E 2190**,** certified through IGCC as complying with requirements of IGCC.

1. Glass: ASTM C 1036, Type 1, Class 1, q3.

   a. Tint: Clear.
   b. Kind: Fully tempered where indicated on Drawings.

2. Lites: Two.
3. Filling: Fill space between glass lites with air.
4. Low-E Coating: Per manufacturer’s standard.

E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As selected by Owner from manufacturer's full range.

G. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

H. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 FABRICATION

A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze wood windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Remove and replace noncomplying windows and retest as specified above.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 085200

SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for board assemblies.

B. System design for non-load bearing components.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 – Rough Carpentry: Exterior wind-load-bearing wood stud framing.

C. Section 07 2100 - Thermal Insulation: Thermal insulation.

D. Section 07 2500 - Weather Barriers: Air barrier and vapor retarder.

E. Section 09 2236 - Metal Lath

F. Section 09 2423 - Portland Cement Plastering.

1.03 REFERENCE STANDARDS

A. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units.

B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units.

C. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

D. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

E. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

G. Federal Specification QQL-201 F.

1.05 SUBMITTALS

A. Refer to Section 01 3300 – Submittals Procedures.

B. Product Data: Provide data on each product.

C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.06 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Installer Qualifications: Company specializing in performing, with minimum three (3) years of documented experience.

C. Do not provide gypsum board products of production or manufacture in the People's Republic of China, due to concerns regarding high levels of elemental sulfur and other impurities and potential resulting deterioration of copper and other metals in electrical, plumbing and HVAC materials and equipment, as well as potentially significant health risk.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as indicated on drawings.

PART 2 PRODUCTS

2.01 BOARD MATERIALS

A. Gypsum Wallboard: ASTM C 1396/C 1396M. Sizes to minimize joints in each area and correspond with support system indicated; ends square cut.

1. Regular Type (GWB):
    a. Application: Use for vertical surfaces, unless otherwise indicated.
    b. Thickness: 5/8 inch.
    c. Edges: Tapered.
2. Fire Resistant Type (GWB-FR): Complying with Type X requirements; UL or WH rated.
    a. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
    b. Thickness: 5/8 inch.
    c. Edges: Tapered.
3. Ceiling Board (GWB-SR): Special sag-resistant type.
    a. Application: Ceilings, unless otherwise indicated.

b. Thickness: 5/8 inch.

c. Edges: Tapered.

2.05 ACCESSORIES

A. Air Barrier and vapor retarder: Refer to Section 07 2500 - Weather Barriers.

B. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.

1. Types: As detailed or required for finished appearance.

2. Special Shapes: In addition to conventional corner beads, J-beads and control joints, provide U-bead at exposed panel edges.

C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.

1. Tape: 2 inch wide, creased paper tape or coated glass fiber tape for joints and corners, except as otherwise indicated.

2. Ready-mixed vinyl-based joint compound.

3. Powder-type vinyl-based joint compound.

D. Control Joint (if required):

1. Product: Model # DRM 50-50, 3-Piece by Fry Reglet: www.fryreglet.com.

2. Finish: Chem Film finish; for the receipt of paint in the field.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

B. Examine areas and substrates, with Installer present for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

2. At exterior soffits, not more than 30 feet apart in both directions.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.03 JOINT TREATMENT

A. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.04 TOLERANCES

A. Maximum Variation of Finished Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 2236 - METAL LATH

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal lath for Portland cement plaster.

1.02 RELATED SECTIONS

A. Section 06 1000 – Rough Carpentry.

B. Section 06 1600 – Sheathing.

C. Section 09 2423 - Portland Cement Plastering.

1.03 REFERENCES

A. ASTM C 847 - Standard Specification for Metal Lath; 2006.

B. ASTM C 933 - Standard Specification for Welded Wire Lath; 2005.

C. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2004.

D. ASTM C 1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2006.

1.04 SUBMITTALS

A. See Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Provide data on furring and lathing components, structural characteristics, material limitations, and finish.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years' experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Lath:

1. Alabama Metal Industries Corporation: www.amico-online.com.
2. Clark Western Building Systems: www.clarkwestern.com.
3. Dietrich Metal Framing: www.dietrichindustries.com.

2.02 FRAMING AND LATH ASSEMBLIES

A. Provide completed assemblies with the following characteristics:

1. Maximum Deflection of Vertical Assemblies: 1:360 under lateral point load of 100 lbs.
2. Maximum Deflection of Horizontal Assemblies: 1:240 deflection under dead loads and wind uplift.

2.03 FRAMING MATERIALS

A. Refer to Section 06 1000 – Rough Carpentry.

2.04 LATH

A. Provide the appropriate lath from the following at locations indicated for plaster:

1. Diamond Mesh Metal Lath: ASTM C 847, galvanized; self-furring.
   a. Weight: To suit application, comply with deflection criteria, and as specified in ASTM C 841 for framing spacing.
2. Flat Rib Metal Lath: ASTM C 847, galvanized; 1/8 inch thick.
   a. Weight: To suit application, comply with deflection criteria, and as specified in ASTM C 841 for framing spacing.
3. Ribbed Metal Lath: ASTM C 847, galvanized; 3/8 inch thick.
   a. Weight: To suit application, comply with deflection criteria, and as specified in ASTM C 841 for framing spacing.
4. Welded Wire Lath: ASTM C 933; galvanized; with 2 inch square openings, paper or felt backing, of weight to suit application, comply with deflection criteria, and as specified in ASTM C 841 for framing spacing.

B. Corner Mesh: Formed sheet steel, minimum 0.018 inch thick, perforated flanges shaped to permit complete embedding in plaster, minimum 2 inch size; same finish as lath.

C. Strip Mesh: Expanded metal lath, same weight as lath, 2 inch wide x 24 inch long; same finish as lath.

D. Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, maximum possible lengths.

1. Material: Formed sheet steel with rust inhibitive primer, expanded metal flanges.
2. Casing Beads: Square edges.
3. Corner Beads: Radiused corners.
4. Base Screeds: Bevelled edges.
5. Expansion Joints: Accordion profile with factory-installed protective tape, 2 inch wide flanges.
6. Control Joints: Accordion profile with protective tape, 2 inch flanges.

2.05 ACCESSORIES

A. Anchorage: Tie wire, nails, and other metal supports, of type and size to suit application; to rigidly secure materials in place, galvanized.

B. Fasteners: ASTM C 1002 self-piercing tapping screws.

C. Tie Wire: Annealed galvanized steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that substrates are ready to receive work and conditions are suitable for application.

C. For exterior plaster and stucco on stud walls, verify that water-resistive barrier has been installed over sheathing substrate completely and correctly.

D. Do not begin until unacceptable conditions have been corrected.

E. If substrate preparation is the responsibility of another installer, notify Designer-of-Record of unsatisfactory preparation before proceeding.

3.02 INSTALLATION - GENERAL

A. Install lath for Portland cement plaster in accordance with ASTM C 1063.

3.03 CONTROL AND EXPANSION JOINTS

A. Install control and expansion joints.

3.04 LATH INSTALLATION

A. Apply metal lath taut, with long dimension perpendicular to supports.

B. Lap ends minimum 1 inch. Secure end laps with tie wire where they occur between supports.

C. Lap sides of diamond mesh lath minimum 1-1/2 inches.

D. Attach metal lath to metal supports using tie wire at maximum 6 inches on center.

E. Attach metal lath to concrete using wire hair pins. Attach anchors to backup surface; space at maximum 24 inches on center.

F. Continuously reinforce internal angles with corner mesh, except where the metal lath returns 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.

G. Place corner bead at external wall corners; fasten at outer edges of lath only.

H. Place base screeds at termination of plaster areas; secure rigidly in place.

I. Place 4 inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.

J. Place lath vertically above each top corner and each side of door frames to 6 inches above ceiling line.

K. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.

L. Place additional strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

3.06 ERECTION TOLERANCES

A. Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet.

B. Maximum Variation from True Position: 1/8 inch.

END OF SECTION

SECTION 09 2423 - PORTLAND CEMENT PLASTERING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Portland cement plaster system for installation over metal lath.

B. Repair of existing cement plaster at walls.

1.02 RELATED SECTIONS

A. Section 06 1000 – Rough Carpentry.

B. Section 06 1600 - Sheathing.

C. Section 09 2236 – Metal Lath.

1.03 REFERENCES

A. ASTM C 150 - Standard Specification for Portland Cement; 2005.

B. ASTM C 206 - Standard Specification for Finishing Hydrated Lime; 2003.

C. ASTM C 926 - Standard Specification for Application of Portland Cement-Based Plaster; 2006.

D. ASTM C 932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering; 2006.

1.04 SUBMITTALS

A. Product Data: Provide data on plaster materials, characteristics and limitations of products specified.

B. Samples: Submit two samples, 12x12 inch in size illustrating finish color and texture.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C 926.

B. Conform to applicable code for fire rated assemblies as indicated on drawings.

1. Coordinate components of fire rated assemblies with materials specified for support of plaster in other sections.

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

1.07 FIELD CONDITIONS

A. Apply plaster only when substrate and ambient air temperatures meet manufacturer's requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Ready-Mixed Finish-Coat Plaster Products: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients. The following are acceptable manufacturers of finish coat products; base and scratch coat materials shall be manufacturer-recommended products from the same manufacturer as selected for the finish coat:

1. Premium Stucco Finish by El Rey Stucco Company, Inc., Div. of ParexLaHabra, Inc.
2. Exterior Stucco Color Coat by LaHabra, Div. of ParexLaHabra, Inc.
3. ColorTek Exterior Stucco by Omega Products International, Inc.
4. Quikcrete Finish Coat Stucco, No. 1201 by Quikcrete.
5. Thoro Stucco by SonoWall, BASF Wall Systems, Inc: www.sonowall.basf.com.

2.01 PLASTER MATERIALS

A. Portland Cement, Aggregates, and Other Materials: In accordance with ASTM C 926.

B. Portland Cement: ASTM C 150, Type I.

C. Lime: ASTM C 206, Type S.

D. Aggregate: In accordance with ASTM C 926.

E. Water: Clean, fresh, potable and free of mineral or organic matter that could adversely affect plaster.

F. Admixtures: As required and approved by the manufacturer.

G. Plaster Mix Reinforcement: As required and approved by the manufacturer.

H. Bonding Agent: As required and approved by the manufacturer.

2.02 METAL LATH

A. Metal Lath and Accessories: As specified in Section 09 2236.23. Use metal lath as plaster base at all horizontal applications and other locations where solid base is not indicated.

B. Beads, Screeds, and Joint Accessories: As specified in Section 09 2236.

2.03 ACCESSORIES

A. Plaster Patching Compound: Emaco R350 CI by BASF: www.buildingsystems.basf.com.

2.04 PLASTER MIXES

A. Over Metal Lath: Three-coat application mixed and proportioned in accordance with manufacturer's instructions.

B. Premixed Plaster Materials: Mix in accordance with manufacturer's instructions.

C. First Coat:

1. One part Portland cement.
2. Minimum 0 and maximum 3/4 part hydrated lime.
3. Minimum 2-1/2 and maximum 4 parts aggregate, per sum of cementitious materials.

D. Second Coat: Same as first coat, except minimum 3 parts and maximum 5 parts aggregate.

E. Finish Coat:

1. One part Portland cement.
2. Minimum 3/4 and maximum 1-1/2 parts lime.
3. 3 parts sand, per sum of cementitious materials.

F. Mix only as much plaster as can be used prior to initial set.

G. Mix materials dry, to uniform color and consistency, before adding water.

H. Protect mixtures from freezing, frost, contamination, and excessive evaporation.

I. Do not retemper mixes after initial set has occurred.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify the suitability of existing conditions before starting work.

B. Metal Lath and Accessories: Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are in place.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Dampen masonry surfaces to reduce excessive suction.

B. Clean concrete surfaces of foreign matter. Clean surfaces using acid solutions, solvents, or detergents. Wash surfaces with clean water.

3.03 PLASTER REPAIR

A. GENERAL

1. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

B. Plaster Cut-Back:

1. Protective clothing, eye protection, and a respirator are required.
2. The removal of plaster shall be done by cutting the plaster with a power saw using a masonry blade. In order to protect the underlying weather-resistive membrane from damage, blade depth shall be set to less than the full thickness of the plaster membrane; adjust the blade depth frequently to account for wear on the blade.
3. The plaster cuts shall be approximately 12 to 24 inches in width across deep cracks or away from the work areas or penetrations and wall openings. Vertical cuts shall be the distance away from penetrations and wall openings necessary to reach the next adjacent vertical stud framing member.
4. At completion of saw cutting, use a cold chisel in the saw cut to fracture the last remaining un-cut thickness of plaster. Plaster shall be pulled off the wall with minimal damage to the underlying weather-resistive membrane. For large areas of removal, it is recommended to cut the plasterinto squares that can be easily handled.
5. In the case that the weather-resistive membrane may be adhered to the back of the plaster, it is required to remove the plaster back to point where the plaster is not bonded the weather-resistive membrane.
6. The straight and smooth saw cut plaster edges shall be rendered jagged and rough to produce a better key between the new patch and existing plaster and can minimize the chance for separation cracks. Chip away small sections of the existing plaster to expose metal lath at the existing edges.

C. Plaster Repair:

1. Prior to application of plaster patches, the weather-resistive membrane shall be peeled back carefully to minimize tears, holes or other damage to the weather-resistive membrane. It is necessary to leave proper overlap of the existing weather-resistive membrane for integration with new weather-resistive membrane or flashings.
    a. A minimum 2-inch overlap shall be provided at horizontal joints.
    b. A minimum 6-inch overlap shall be provided at vertical joints.
2. Apply scratch coat and brown coat as indicated for New Plastering below.
3. Apply finish coat as indicated for New Plastering below.
    a. Finish coat shall be applied no sooner than 7 full days after brown coat has been applied. Apply finish coat and feather into and match existing texture.
    b. Match existing or approved texture sample.

D. Plaster Patching:

1. Provide plaster patching in lieu of plaster repairs ONLY for cracks 1/8 inch wide or less and dents 1/8 inch or less in depth and 4 inches or less in widest dimension.

2. Prepare and clean surfaces as recommended by the manufacturer.
3. Install plaster patching compound as directed by the manufacturer.

3.04 NEW PLASTERING

A. Apply plaster in accordance with ASTM C 926.

B. Three-Coat Application Over Metal Lath:

1. Apply first coat to a nominal thickness of 3/8 inch.
2. Apply second coat to a nominal thickness of 3/8 inch.
3. Apply finish coat to a nominal thickness of 1/8 inch.

C. In exterior work, scribe contraction joints through entire plaster application as indicated. If not indicated, scribe at 10 feet on center each way.

D. Moist cure base coats.

E. Apply second coat immediately following initial set of first coat.

F. After curing, dampen previous coat prior to applying finish coat.

G. Finish Texture: Float to a consistent and smooth finish.

H. Avoid excessive working of surface. Delay troweling as long as possible to avoid drawing excess fines to surface.

I. Moist cure finish coat for minimum period of 48 hours.

3.05 ERECTION TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet.

3.07 PROTECTION

A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 09 9000 - PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and other coatings, exterior.

1.02 RELATED SECTIONS

A. Section 01 2500 – Substitution Procedures.

B. Section 09 2116 – Gypsum Board Assemblies

C. Section 09 2423 - Portland Cement Plastering.

1.03 REFERENCES

A. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 1992 (Reapproved 2003).

B. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings; Fourth Edition.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittals, for submittal procedures.

B. Product Data: Provide data on each type of product indicated, including VOC content.

C. Samples: Submit two paper chip samples, 8-1/25 x 11 inches in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.

F. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

G. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces. Include draw-downs of each type and/or color of finish paint.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Paint Materials: 1 gallon of each type and/or color of finish paint.

2. Label each container with color and type (P-#) in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

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

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years' experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Paints, General:

1. Basis-of-Design manufacturers:

a. ICI Paints North America, Div. of Akzo Nobel Paints LLC: www.icipaints.com.

b. Rodda Paint Company: www.roddapaint.com.

c. Miller Paint, Inc.: www.millerpaint.com.

2. Other acceptable manufacturers:

a. Benjamin Moore & Co: www.benjaminmoore.com.

b. Parker Paint: www.parkerpaint.com.

c. Pittsburgh Paints: www.ppgpittsburghpaints.com.

d. Sherwin Williams: www.sherwin-williams.com.

3. Substitutions: Refer to Section 01 2500 - Substitution Procedures.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:

1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.

2. For good flow and brushing properties.

3. Capable of drying or curing free of streaks or sags.

B. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

D. Chemical Content: The following compounds are prohibited:

1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

2.03 PAINT SYSTEMS - NOMENCLATURE

A. Key: Painting system identification below as follows: (1, 2)-(3)-(4, 5); i.e. WE-OP-3A = Wood, Exterior - Opaque - 3-coats, Alkyd.

1. Substrate:

a. C = Concrete/masonry/cement plaster.

b. F = Fabric.

c. G = Gypsum board.

d. M = Metal.

e. Ma = Metal, aluminum.

f. Mg = Metal, galvanized.

g. W = Wood.

2. Location:

a. E = Exterior.

b. I = Interior.

3. Finish:

a. OP = OPaque.

b. P = Primer.

c. TR = TRansparent.

4. Number of Coats: Two or three, including primers, as indicated.

5. Paint Type:

a. A = Alkyd.

b. El = Epoxy.

c. Ep = Epoxy.

d. F = Fire-retardant, intumescent.

e. L = Latex.

f. S = Sealer

g. V = Varnish, no stain.

h. VS = Varnish, Stain

2.04 PAINT SYSTEMS - EXTERIOR

A. Paint CE-OP-3A - Concrete/masonry/cement plaster, Opaque, Elastomeric (Water Based), 2 or 3 Coat:

1. One coat of primer.

a. Product: ICI Hydrosealer 6001 acrylic primer; or approved equal.

b. Product: Rodda 512301 Phlex-tite Acrylic Elastomeric Primer/ Finish, 48 g/L VOC; or approved equal.

2. Flat: One or two coats of elastomeric coating as required.

a. Product: ICI Decra-Flex 300 elastomeric waterborne coating, #2260 Smooth, 70 g/l VOC; or approved equal.

b. Product: Rodda 512301 pHlex-tite Acrylic Elastomeric Primer/ Finish, 48 g/L VOC; or approved equal.

B. Paint WE-OP-3A – Wood Windows and Doors, Opaque, Elastomeric (Water Based), 2 or 3 Coat:

1. One coat of primer. For Wood Windows and doors, primer applied at factory.

a. Product: ICI Hydrosealer 6001 acrylic primer; or approved equal.

b. Product: Rodda 512301 Phlex-tite Acrylic Elastomeric Primer/ Finish, 48 g/L VOC; or approved equal.

2. Flat: One or two coats of elastomeric coating as required.

a. Product: ICI Decra-Flex 300 elastomeric waterborne coating, #2260 Smooth, 70 g/l VOC; or approved equal.

b. Product: Rodda 512301 pHlex-tite Acrylic Elastomeric Primer/ Finish, 48 g/L VOC; or approved equal.

2.05 PAINT SYSTEMS - INTERIOR

A. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:

1. One coat of alkyd primer sealer.

a. Product: ICI Dulux 1000 Prep and Prime, 92 g/l VOC, or approved equal.

2. Gloss: Two coats of latex enamel.

a. Product: Miller Speed Hide 100% Acrylic Gloss 99 g/l VOC, or approved equal.

3. Semi-gloss: Two coats of latex enamel.

a. Product: Miller Speed Hide Semi Gloss 49 g/l VOC, or approved equal.

b. Satin: Two coats of latex enamel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums, or as required by manufacturer:

1. Cement Plaster: 12 percent.

3.02 PREPARATION

A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

B. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

C. Marks: Seal with shellac those which may bleed through surface finishes.

E. Cement Plaster Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate (TSP); rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand wood surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

3.05 FIELD QUALITY CONTROL

A. See Division 1 Sections for general requirements for field inspection see 3.06 Cleaning.

1. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 SCHEDULE - SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:

1. Items fully factory-finished unless specifically noted.

2. Fire rating labels, equipment serial number and capacity labels.

3. Stainless steel items.

B. Paint the surfaces described below under Schedule - Paint Systems.

3.07 SCHEDULE - PAINT SYSTEMS

A. Cement Plastering:

1. Exterior: CEl-OP-3A, flat.

B. Wood Windows:

1. Exterior: WE-OP-3A, flat.

C. Gypsum Board:

1. Interior: GI-OP-3L, flat.

3.08 SCHEDULE - COLORS

A. Colors to be selected by owner.

END OF SECTION