

THE FORUM
ROME, GEORGIA
FOR
FLOYD COUNTY
PROJECT MANUAL
(BALLROOM AND CONCESSIONS)

Construction Documents

Architect's Project Number:

420.01.01

Issued: November 11, 2016



PEACOCK
architects

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1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. H. Dean Peacock, Peacock Partnership
2. Responsible for Divisions 01-14 Sections included in project manual except where indicated as prepared by other design professionals of record.

B. Fire-Protection, Plumbing, HVAC and Electrical Engineer:

1. Christopher Esslinger, Westside Engineering
2. Responsible for Divisions 21, 22, 23 & 26.

END OF DOCUMENT 000107

DOCUMENT 009113 - ADDENDA

1.1 As issued.

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. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.

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: The Forum.

1. Project Location: 301 Tribune Street,
Rome, Georgia 30161

B. Owner: Floyd County, Georgia.

1. Owner's Representative: Nancy Lam, Purchasing Director
Floyd County Board of Commissioners, 12 East 4th Avenue, Suite 106
Ph (706) 291-5109 Fx (706) 290-6099

C. Architect: Peacock Partnership,

1. Mr. H. Dean Peacock, 5525 Interstate North Parkway, Atlanta GA.
Ph 404.214.5200 Fx 404.214.5208

D. Contractor: Shall be selected by public bid for this Project.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

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

1. The project consists of the renovation of specific areas within a single building as described in the Contract Documents.

B. Type of Contract:

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

1.4 PHASED CONSTRUCTION

- A. The Work shall be conducted in one phase as indicated in the drawings.
- B. Before commencing Work, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates, as well as, the move-out and -in dates of Owner's personnel for all phases of the Work. The move-out and-in dates of Owner's personnel for each phase of work is to be coordinated with the Owner's representative.

1.5 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits as indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways, and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
- 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.

1.6 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site as well as existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1.7 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 as determined in the pre-construction meeting, Monday through Friday. Any work to be conducted outside of the specified working hours above shall be coordinated and approved by the Owner.
- 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 seven standard days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with any utility interruptions.
- D. Restricted Substances: Use of tobacco products and other controlled substances within the existing building or on the Project site is not permitted.
- E. Workers are to conduct themselves in a business-like and respectful manner while on the premises and to restrict their movements to those areas of the premises necessary for performing the work.

1.8 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 in writing by the Architect.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

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

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. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.

- h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in other nationally recognized standards organizations such as ASTM, UL, American's Disability Act Accessibility Guidelines, effect for Project, and other nationally recognized standards organizations.
 - j. Comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - 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.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 10 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request, or seven days of receipt of additional information or documentation.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated above.

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 if required testing information does not exist.

1.5 PROCEDURES

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

1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 10 days prior to time required for preparation and review of related submittals.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results and has been reviewed, stamped and signed by the Contractor.
 - b. Substitution request is fully documented and properly submitted and has been reviewed, stamped and signed by the Contractor.

- c. .
 - d. Requested substitution has received approvals of authorities having jurisdiction if necessary.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved and affirmed by the Contractor in writing.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 10 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and has been reviewed, stamped and signed by Contractor.
 - e. Requested substitution will not adversely affect Contractor's construction schedule as affirmed by Contractor in writing.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction if necessary and affirmed by the Contractor in writing.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work as affirmed by the Contractor in writing.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved as affirmed by the Contractor in writing.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 MINOR CHANGES IN THE WORK

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

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 14 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.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.4 CHANGE ORDER PROCEDURES

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

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.6 WORK CHANGE DIRECTIVE

- A. Work Change Directive: Architect may issue a Work Change Directive on EJCDC Document C-940. Work 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.

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 items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than 10 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. Arrange schedule of values consistent with format of AIA Document G703.
 - 2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - 3. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 - 4. Allowances (if used): 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.
 - 5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
 - 6. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 - 7. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling **[five]** <Insert number> percent of the Contract Sum and subcontract amount.
 - 8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the 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 Architect by the twentieth of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
 - 1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- D. Application for Payment Forms: Use **AIA Document G702** and **AIA Document G703** as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect 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 subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 - 5. Waiver Forms: Submit 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. Products list (preliminary if not final).
 5. Sustainable design action plans, including preliminary project materials cost data.
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of 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.
 5. AIA Document G706A.
 6. AIA Document G707.
 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 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Project meetings.
- B. Related Requirements:
 - 1. Section 011200 "Multiple Contract Summary" for a description of the division of work among separate contracts and responsibility for coordination activities not in this Section.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 019113 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.3 DEFINITIONS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

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

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate sub-framing for support of ceiling, raised access floor, and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to

- accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 2. File Preparation Format: DWG, in AutoCad 2010 format or that approved by Architect.
 3. File Submittal Format: Submit or post coordination drawing files using PDF format.

1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect.
 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 suggested resolution 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: form with substantially the same content as indicated above, acceptable to Architect.

- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within seven 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 monthly. Log to include not less than the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Architect's Data Files Not Available: Architect will not provide Architect's BIM model digital data files for Contractor's use during construction.
- B. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 3. Digital Drawing Software Program: Contract Drawings are available in DWG format in AutoCad.
 4. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

- a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.
5. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Reflected ceiling plans.
 - c. Millwork elevations and sections

C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, at a time and date agreeable to Owner, Architect and Contractor to be held after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Sustainable design requirements.
 - o. Preparation of Record Documents.
 - p. Use of the premises and existing building.
 - q. Work restrictions.
 - r. Working hours.
 - s. Owner's occupancy requirements.
 - t. Responsibility for temporary facilities and controls.
 - u. Procedures for moisture and mold control.

- v. Procedures for disruptions and shutdowns.
 - w. Construction waste management and recycling.
 - x. Parking availability.
 - y. Office, work, and storage areas.
 - z. Equipment deliveries and priorities.
 - aa. First aid.
 - bb. Security.
 - cc. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Regulations of authorities having jurisdiction.
 - u. Testing and inspecting requirements.
 - v. Installation procedures.
 - w. Coordination with other work.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at regular intervals to be determined by the Owner, Architect and Contractor.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFIs.
 - 16) Status of Proposal Requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

The Forum
Rome Georgia
(Ballroom and Concessions Package)

November 9, 2016

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
1. Contractor's Construction Schedule.
 2. Construction schedule updating reports.
 3. Daily construction reports.
 4. Site condition reports.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 2. Predecessor Activity: An activity that precedes another activity in the network.
 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
1. PDF file.

2. Two paper copies, of sufficient size to display entire period or schedule, as required.
- B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
 2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
 3. Total Float Report: List of activities sorted in ascending order of total float.
- E. Construction Schedule Updating Reports: Submit with Applications for Payment.
- F. Daily Construction Reports: Submit at monthly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

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

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for [commencement of the Notice to Proceed to date of Substantial Completion].
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule.

Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 5. Commissioning Time: Include no fewer than 15 days for commissioning.
 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 7. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 3. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use-of-premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
 2. Unanswered Requests for Information.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
 5. Pending modifications affecting the Work and the Contract Time.
- F. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.

- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.6 CPM SCHEDULE REQUIREMENTS

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.
 - 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and inspection.
 - j. Commissioning.
 - k. Punch list and final completion.

1. Activities occurring following final completion.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
 8. Testing and inspection.
- H. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS

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

1.3 SUBMITTAL SCHEDULE

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

1.4 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Architect.
 - 4. Name of Contractor.
 - 5. Name of firm or entity that prepared submittal.
 - 6. Names of subcontractor, manufacturer, and supplier.
 - 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 - 8. Category and type of submittal.
 - 9. Indication of full or partial submittal.
 - 10. Location(s) where product is to be installed, as appropriate.
 - 11. Remarks.
 - 12. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional

information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Paper Submittals:

1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
2. Provide a space approximately on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Action Submittals: Submit five paper copies of each submittal unless otherwise indicated. Architect will return two copies.
4. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
5. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using Contractor's standard transmittal form.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Paper: Prepare submittals in paper form, and deliver to Architect.

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

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

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

1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow 10 days for review of each resubmittal.

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

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

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

1.6 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.

- f. Specification paragraph number and generic name of each item.
3. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
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 of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit two sets of Samples. Architect will retain one Sample set; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
 1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer

or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.

2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.7 DELEGATED-DESIGN SERVICES

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

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit two paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 1. **Architect will not review submittals received from Contractor that do not have Contractor's review and approval. Architect will return submittal without review.**

1.9 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required.
 1. Paper Submittals: Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- D. Architect will return without review submittals received from sources other than Contractor.
- E. Submittals not required by the Contract Documents will be returned by Architect without action.

END OF SECTION 013300

SECTION 013516 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes special procedures for alteration work.

1.2 DEFINITIONS

- A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- B. Consolidate: To strengthen loose or deteriorated materials in place.
- C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
- D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- K. Retain: To keep existing items that are not to be removed or dismantled.
- L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 PROJECT MEETINGS FOR ALTERATION WORK

- A. Preliminary Conference for Alteration Work: Before starting alteration work, Architect will conduct a conference at Project site.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor, others as required shall be represented at the meeting.
 2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:
 - a. Fire-prevention plan.
 - b. Governing regulations.
 - c. Areas where existing construction is to remain and the required protection.
 - d. Hauling routes.
 - e. Sequence of alteration work operations.
 - f. Storage, protection, and accounting for salvaged and specially fabricated items.
 - g. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
 3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.
- B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at intervals as determined by Owner, Architect and Contractor.. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
1. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.
 2. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- 1.4 MATERIALS OWNERSHIP
- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Alteration Work Program: Submit 30 days before work begins.
 - B. Fire-Prevention Plan: Submit 30 days before work begins.
- 1.6 QUALITY ASSURANCE
- A. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.
 - B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.
- D. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.7 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials:

1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location.
2. Secure stored materials to protect from theft.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
 - 1. Use only proven protection methods, appropriate to each area and surface being protected.
 - 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
 - 3. Erect temporary barriers to form and maintain fire-egress routes.
 - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
 - 5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
 - 6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
 - 7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
 - 8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.
- B. Temporary Protection of Materials to Remain:
 - 1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
 - 2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.
- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
- D. Utility and Communications Services:
 - 1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
 - 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
 - 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.
- E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.
 - 1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
 - 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

- F. Existing Roofing: Prior to the start of work in an area, install roofing protection.

3.2 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:

- 1. Comply with NFPA 241 requirements unless otherwise indicated.
- 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.

- a. If combustible material cannot be removed, provide fire blankets to cover such materials.

- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:

- 1. Obtain Owner's approval for operations involving use of welding or other high-heat equipment. Notify Owner at least 48 hours before each occurrence, indicating location of such work.
- 2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
- 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
- 4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
- 5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
- 6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:

- a. Train each fire watch in the proper operation of fire-control equipment and alarms.
- b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
- c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
- d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
- e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.

- C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

- D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

- 1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

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

3.4 GENERAL ALTERATION WORK

- A. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
- B. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
 - 1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 013516

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Commissioning Authority (if any required), or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
 - 2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements, or as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.

3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
 - E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
 - F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
 - G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
 - H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
 - I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
 - J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.
- 1.3 DELEGATED-DESIGN SERVICES
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
- 1.4 CONFLICTING REQUIREMENTS
- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
 - B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Statement on condition of substrates and their acceptability for installation of product.
 2. Statement that products at Project site comply with requirements.
 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Statement that equipment complies with requirements.
 2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 3. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to **ASTM E 329** or other nationally recognized standards agency; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

- H. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
 - I. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
 - J. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. **Contractor responsibilities include the following:**
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - d. When testing is complete, remove test specimens and test assemblies, and mockups, and laboratory mockups; do not reuse products on Project.
 - 2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - K. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of size indicated.
 - 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 - 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
 - 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 8. Demolish and remove mockups when directed unless otherwise indicated.
 - L. **Laboratory Mockups:** Comply with requirements of preconstruction testing and those specified in individual Specification Sections.
- 1.9 **QUALITY CONTROL**
- A. **Owner Responsibilities:** Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspection will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

- G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 SPECIAL TESTS AND INSPECTIONS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

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

- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

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

1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.
 1. AABC - Associated Air Balance Council; www.aabc.com.
 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 7. ABMA - American Boiler Manufacturers Association; www.abma.com.
 8. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
 9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 11. AF&PA - American Forest & Paper Association; www.afandpa.org.
 12. AGA - American Gas Association; www.aga.org.
 13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
 14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 15. AI - Asphalt Institute; www.asphaltinstitute.org.
 16. AIA - American Institute of Architects (The); www.aia.org.
 17. AISC - American Institute of Steel Construction; www.aisc.org.
 18. AISI - American Iron and Steel Institute; <http://www.steel.org>.
 19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
 20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
 21. ANSI - American National Standards Institute; www.ansi.org.
 22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 23. APA - APA - The Engineered Wood Association; www.apawood.org.
 24. APA - Architectural Precast Association; www.archprecast.org.
 25. API - American Petroleum Institute; www.api.org.
 26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
 27. ARI - American Refrigeration Institute; (See AHRI).
 28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
 29. ASCE - American Society of Civil Engineers; www.asce.org.
 30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
 31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
 32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
 33. ASSE - American Society of Safety Engineers (The); www.asse.org.
 34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
 35. ASTM - ASTM International; www.astm.org.
 36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
 37. AWEA - American Wind Energy Association; www.awea.org.
 38. AWI - Architectural Woodwork Institute; www.awinet.org.

39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsintstitute.org.
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
83. FM Approvals - FM Approvals LLC; www.fmglobal.com.
84. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarroof.com.
86. FSA - Fluid Sealing Association; www.fluidsealing.com.
87. FSC - Forest Stewardship Council U.S.; www.fscus.org.

88. GA - Gypsum Association; www.gypsum.org.
89. GANA - Glass Association of North America; www.glasswebsite.com.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
95. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
96. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
97. IAS - International Accreditation Service; www.iasonline.org.
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; www.iccsafe.org.
101. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
102. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
104. IEC - International Electrotechnical Commission; www.iec.ch.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
109. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. IGSHA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
111. ILI - Indiana Limestone Institute of America, Inc.; www.ili.ai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
116. ISO - International Organization for Standardization; www.iso.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
119. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; www.lightning.org.
122. MBMA - Metal Building Manufacturers Association; www.mbma.com.
123. MCA - Metal Construction Association; www.metalconstruction.org.
124. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
125. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
126. MHIA - Material Handling Industry of America; www.mhia.org.
127. MIA - Marble Institute of America; www.mhia.org.
128. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
129. MPI - Master Painters Institute; www.paintinfo.com.
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
131. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
132. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
133. NADCA - National Air Duct Cleaners Association; www.nadca.com.
134. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
135. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
136. NBI - New Buildings Institute; www.newbuildings.org.

137. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
138. NCMA - National Concrete Masonry Association; www.ncma.org.
139. NEBB - National Environmental Balancing Bureau; www.nebb.org.
140. NECA - National Electrical Contractors Association; www.necanet.org.
141. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
142. NEMA - National Electrical Manufacturers Association; www.nema.org.
143. NETA - InterNational Electrical Testing Association; www.netaworld.org.
144. NFHS - National Federation of State High School Associations; www.nfhs.org.
145. NFPA - National Fire Protection Association; www.nfpa.org.
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; www.nfrc.org.
148. NHLA - National Hardwood Lumber Association; www.nhla.com.
149. NLGA - National Lumber Grades Authority; www.nlga.org.
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
151. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
152. NRCA - National Roofing Contractors Association; www.nrca.net.
153. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
154. NSF - NSF International; www.nsf.org.
155. NSPE - National Society of Professional Engineers; www.nspe.org.
156. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
158. NWFA - National Wood Flooring Association; www.nwfa.org.
159. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
160. PDI - Plumbing & Drainage Institute; www.pdionline.org.
161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
162. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
163. RFCI - Resilient Floor Covering Institute; www.rfci.com.
164. RIS - Redwood Inspection Service; www.redwoodinspection.com.
165. SAE - SAE International; www.sae.org.
166. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
167. SDI - Steel Deck Institute; www.sdi.org.
168. SDI - Steel Door Institute; www.steeldoor.org.
169. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; www.siaonline.org.
172. SJI - Steel Joist Institute; www.steeljoist.org.
173. SMA - Screen Manufacturers Association; www.smainfo.org.
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
175. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
176. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
177. SPIB - Southern Pine Inspection Bureau; www.spib.org.
178. SPRI - Single Ply Roofing Industry; www.spri.org.
179. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
180. SSINA - Specialty Steel Industry of North America; www.ssina.com.
181. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
182. STI - Steel Tank Institute; www.steeltank.com.
183. SWI - Steel Window Institute; www.steelwindows.com.
184. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
185. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
186. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.

189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
 190. TMS - The Masonry Society; www.masonrysociety.org.
 191. TPI - Truss Plate Institute; www.tpinst.org.
 192. TPI - Turfgrass Producers International; www.turfgrasssod.org.
 193. TRI - Tile Roofing Institute; www.tilerroofing.org.
 194. UL - Underwriters Laboratories Inc.; www.ul.com.
 195. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
 196. USAV - USA Volleyball; www.usavolleyball.org.
 197. USGBC - U.S. Green Building Council; www.usgbc.org.
 198. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
 199. WASTEC - Waste Equipment Technology Association; www.wastec.org.
 200. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
 201. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
 202. WDMA - Window & Door Manufacturers Association; www.wdma.com.
 203. WI - Woodwork Institute; www.wicnet.org.
 204. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
 205. WWPA - Western Wood Products Association; www.wwpa.org.
- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.
1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
 2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 3. ICC - International Code Council; www.iccsafe.org.
 4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.
- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.
1. COE - Army Corps of Engineers; www.usace.army.mil.
 2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
 3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
 4. DOD - Department of Defense; www.quicksearch.dla.mil.
 5. DOE - Department of Energy; www.energy.gov.
 6. EPA - Environmental Protection Agency; www.epa.gov.
 7. FAA - Federal Aviation Administration; www.faa.gov.
 8. FG - Federal Government Publications; www.gpo.gov/fdsys.
 9. GSA - General Services Administration; www.gsa.gov.
 10. HUD - Department of Housing and Urban Development; www.hud.gov.
 11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
 12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
 13. SD - Department of State; www.state.gov.
 14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
 15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
 16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
 17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
 18. USP - U.S. Pharmacopeial Convention; www.usp.org.
 19. USPS - United States Postal Service; www.usps.com.

- E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
 3. DSCC - Defense Supply Center Columbus; (See FS).
 4. FED-STD - Federal Standard; (See FS).
 5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
 6. MILSPEC - Military Specification and Standards; (See DOD).
 7. USAB - United States Access Board; www.access-board.gov.
 8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 3. CDHS; California Department of Health Services; (See CDPH).
 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservation.tamu.edu.

END OF SECTION 014200

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 engaged in the Project to use temporary services and facilities without cost, including, but not limited to Architect, testing agencies, and authorities having jurisdiction. Unless noted otherwise
- 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. Unless noted otherwise
- 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. Unless noted otherwise

1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.

4. Waste-handling procedures.
5. Other dust-control measures.

1.4 QUALITY ASSURANCE

- A. Accessible Temporary Egress: If temporary Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines an ICC/ANSI A117.1.

PART 2 - PRODUCTS

2.1 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.
 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of as required by Owner at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures."
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

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

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- C. Temporary 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.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- D. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
- E. Electric Power Service: Provided by Owner.
 - 1. Install electric power service overhead unless otherwise indicated.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- G. Telephone Service: Provide temporary phone service or cell phone number for contact purposes.

3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- B. Parking: Use **designated areas of Owner's existing** parking areas for construction personnel.
- C. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
- D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.
- E. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- F. 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."
- G. 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.
- H. 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.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Comply with **requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and** requirements specified in Section 311000 "Site Clearing."
- 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 workday.
- 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 Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by **Owner** from fumes and noise.
 1. Construct dustproof partitions with joints taped on occupied side.

2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
3. Provide walk-off mats at each entrance through temporary partition.

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Keep interior spaces reasonably clean and protected from water damage.
 2. Periodically collect and remove waste containing cellulose or other organic matter.
 3. Discard or replace water-damaged material.
 4. Discard and replace stored or installed material that begins to grow mold.
 5. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. 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 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 14 days of

receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

- a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

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

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

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

C. Storage:

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

1.6 PRODUCT WARRANTIES

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

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: ..."
 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

- a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.
 - a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: ..."
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: ..."
7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 2. Evidence that proposed product provides specified warranty.
 3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 4. Samples, if requested.

END OF SECTION 016000

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 3. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.2 ACTION SUBMITTALS

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

1.3 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 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 14 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 5. Submit testing, adjusting, and balancing records.
 6. Submit sustainable design submittals not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 30 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 14 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1.5 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect.

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

3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1.6 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,
 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. Three paper copies. Architect, will return one copy.

1.7 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranties in Paper Form:
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. 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.
 - c. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - d. Sweep concrete floors broom clean in unoccupied spaces.
 - e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - f. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - g. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - h. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - i. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

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.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
1. Record Drawings.
 2. Record Specifications.
 3. Record Product Data.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
1. Number of Copies: Submit two sets of marked-up record prints.
 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Final Submittal:
 - 1) Submit one paper-copy set of marked-up record prints.
- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Record data as soon as possible after obtaining it.
 - c. Record and check the markup before enclosing concealed installations.
 - d. Cross-reference record prints to corresponding photographic documentation.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Changes made by Change Order or Construction Change Directive.
 - b. Changes made following Architect's written orders.
 - c. Field records for variable and concealed conditions.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. Note related Change Orders, record Product Data, and record Drawings where applicable.
- C. Format: Submit record Specifications as paper copy.

1.4 MAINTENANCE OF RECORD DOCUMENTS

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

END OF SECTION 017839

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

1.2 MATERIALS OWNERSHIP

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

1.3 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.

1.4 CLOSEOUT SUBMITTALS

- A. Inventory of items that have been removed and salvaged.

1.5 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.6 WARRANTY

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.
- C. Coordinate items to be demolished and or salvaged by other disciplines.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Notify the structural engineer of any condition that raises concern as to whether removing that element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Notify Owner one week prior to any disruption in utilities as part of the Demolition / Construction of the Work.
- B. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

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

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting

- flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Maintain fire watch during and for at least <Insert number> hours after flame-cutting operations.
 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 6. Dispose of demolished items and materials promptly.[Comply with requirements in Section 017419 "Construction Waste Management and Disposal."]
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition[and cleaned] and reinstalled in their original locations after selective demolition operations are complete.

3.6 CLEANING

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 054000 - COLD-FORMED METAL FRAMING

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. Exterior non-load-bearing wall framing.
 - 2. Interior load-bearing framing
 - 3. Ceiling joist framing.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for masonry shelf angles and connections.
 - 2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies.
 - 3. Section 092216 "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory.
- B. Shop Drawings: Provide shop drawings prepared by cold-formed metal framing manufacturer and sealed by a qualified professional engineer, who shall be licensed in the State in which the Project is located.
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
 - 3. For cold-formed metal framing indicated to comply with design loads, include structural analysis and detailed shop drawings

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips.
7. Miscellaneous structural clips and accessories.

D. Research/Evaluation Reports: For cold-formed steel framing.

1. Metal stud manufacturer to have a third party evaluation report for its products that are reviewed to the local building code or its model code (IBC 2009 and AISI S100 or IBC 2012 and AISI S100).

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Member in good standing of the Steel Framing Industry Association (SFIA).

1. Products to be certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98 IAS Accreditation Criteria for Inspection Agencies.

B. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this project in material, design, and extent.

D. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

E. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

F. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel".

G. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by, and displaying a classification label from, a testing and inspecting agency acceptable to authorities having jurisdiction.

H. Comply with AISI Specifications and Standards.

1. AISI S100 "North American Specification for the Design of Cold-Formed Steel Structural Members".
2. AISI S200 "North American Standard for Cold-Formed Steel Framing – General Provisions".

3. AISI S201 "North American Standard for Cold-Formed Steel Framing – Product Standard".
4. AISI S211 "North American Standard for Cold-Formed Steel Framing – Wall Stud Design".
5. AISI S212 "North American Standard for Cold-Formed Steel Framing – Header Design".
6. AISI S213 "North American Standard for Cold-Formed Steel Framing – Lateral Design".
7. AISI "Code of Standard Practice for Cold-Formed Steel Structural Framing".

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide cold-formed metal framing products manufactured by ClarkDietrich Building Systems; as specified in other Part 2 articles or comparable products from members of the SFIA:

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 1. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Load-Bearing Wall Framing: Horizontal deflection of 1/600 for load bearing, unless noted otherwise. See SFIA tables for recommendations.
 - b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height under a horizontal l).
 - c. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height unless noted otherwise.
 - d. Ceiling Joist Framing: Vertical deflection of 1/360 of the span for live loads and 1/240 for total loads of the span unless noted otherwise.
 2. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
 3. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1/2 inch.
 4. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

- B. Cold-Formed Steel Framing Design Standards:
 - 1. Wall Studs: AISI S211.
 - 2. Headers: AISI S212.
 - 3. Lateral Design: AISI S213.
- C. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than that allowed by ASTM C955..
- B. Framing Members, General: Comply with ASTM C 955 for conditions indicated.
- C. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60.
- D. Steel Sheet for Vertical Deflection Clips: ASTM A 1003/A 1003M, ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60.

2.4 LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, meeting ASTM C 955 and as follows:
 - 1. Minimum Base-Steel Thickness: 0.0538 inch.
 - 2. Flange Width: 1-5/8 inches
 - 3. Section Properties: As required for design.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, punched, with straight flanges, and as follows:
 - 1. Minimum Base-Steel Thickness: 0.0538 inch.
 - 2. Flange Width: 2 inches.

- C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Steel Thickness: 0.0538 inch
 - 2. Flange Width: 2 inches.
 - 3. Section Properties: As required by structural performance.

- D. U-Channel Assembly: Manufacturer's standard length U-Channel for lateral bracing for exterior curtain wall framing, loadbearing walls, or high interior partitions constructed of structural studs.
 - 1. U-Channel Size: 1-1/2 inches.
 - 2. U-Channel Minimum Base-Steel Thickness: 0.0538 inch.

2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Steel Thickness: 0.0538 inch.
 - 2. Flange Width: 2 inches.
 - 3. Section Properties: As required by structural performance

- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
 - 1. Minimum Base-Steel Thickness: 0.0538 inch.
 - 2. Flange Width: 2 inches.

- C. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web and capable of resisting forces imposed by the wall system.

- D. Deflection Track and Firestop Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thicknesses not less than indicated for studs and in width to accommodate depth of studs.

2.6 CEILING JOIST FRAMING

- A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges, and as follows:
 - 1. Basis-of-Design Product: ClarkDietrich Building Systems.
 - 2. Minimum Base-Steel Thickness: 0.0538 inch.
 - 3. Flange Width: 2 inches, minimum.
 - 4. Section Properties: As required by structural performance.

2.7 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. End clips.
 - 6. Foundation clips.
 - 7. Gusset plates.
 - 8. Stud kickers and knee braces.
 - 9. Joist hangers and end closures.
 - 10. Hole reinforcing plates.
 - 11. Backer plates.

2.8 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 55, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.9 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.

- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multi-monomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 in thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.10 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.
- C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Install cold-formed framing in accordance with ASTM C1007 and AISI S200 "North American Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- B. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

- a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 LOAD-BEARING WALL INSTALLATION

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
1. Anchor Spacing: 32 inches o.c..
- B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
1. Stud Spacing: As indicated.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes or Heavy Duty Stud (HDS) components or as indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
 - 1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads. A single proprietary jamb member designed specifically for the purpose of supporting the header may be used in lieu of multiple members.
 - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
 - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install horizontal bridging in stud system, spaced vertically 48 inches or as indicated on drawings. Fasten at each stud intersection.
 - 1. Bridging: Steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches deep.
 - 2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure as shown in shop drawings.
- K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 16 inches unless noted otherwise.

- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 - 3. Connect FastClip Slide Clip (FCSC), Extended FastClip Slide Clip (FCEC), Flat Tail Slide Clip (FTSC), Fast Top Clip (FTC), or Fast Strut Clip (FS) vertical deflection clips to bypassing or infill studs and anchor to building structure unless noted otherwise on structural drawings.
 - 4. Connect drift clips to cold-formed metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
 - 1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - a. Install solid blocking at 96-inch centers.
 - 2. Bridging: Steel channel, welded or mechanically fastened to webs of punched studs.
 - 3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, to ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rooftop equipment bases and support curbs.
2. Wood blocking, cants, and nailers.
3. Wood furring and grounds.
4. Utility shelving.
5. Plywood backing panels.

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.
- B. Maximum Moisture Content of Lumber: 15 percent, 19 percent for KD 15 marked lumber.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or 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, stripping, 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 above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 3. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841. Retain option in first paragraph below if required for plywood backing panels.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- D. Application: Treat wood members indicated on Drawings, and the following:
 1. Framing for raised platforms.
 2. Concealed blocking.
 3. Roof framing and blocking.
 4. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
 5. Plywood backing panels.

2.4 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. Rooftop equipment bases and support curbs.
 4. Cants.
 5. Furring.
 6. Grounds.
 7. Utility shelving.
- B. Dimension Lumber Items: Construction or No. 2, grade lumber of any species.

- C. Utility Shelving: Lumber with 15 percent maximum moisture content of eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. Concealed Boards: 15 percent maximum moisture content of any of the following species and grades:
 - 1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
 - 2. Eastern softwoods, No. 2 Common grade; NELMA.
 - 3. Northern species, No. 2 Common grade; NLGA.
 - 4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated (if noted to be treated), in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where 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 or of Type 304 stainless steel.
- B. Screws for Fastening to Metal Framing: ASTM C 1002 and ASTM C 954, length as recommended by screw manufacturer for material being fastened.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.7 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing furring and sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate **furring**, nailers, blocking, **grounds**, and similar supports to comply with requirements for attaching other construction.

- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- F. Securely attach 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.
 - 2. 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.
 - 3. ICC-ES evaluation report for fastener.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

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

B. Related Requirements:

1. Section 123623.13 "Plastic-Laminate-Clad Countertops."
2. Section 123661.16 "Solid Surfacing Countertops".

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate fire-retardant-treated materials and cabinet hardware and accessories.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- C. Samples:
 1. Plastic laminates, for each color, pattern, and surface finish.

1.3 INFORMATIONAL SUBMITTALS

- A. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates and/or WI Certified Compliance Program certificates.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Certified participant in AWI's Quality Certification Program and /or Licensee of WI's Certified Compliance Program.
- B. Installer Qualifications: Fabricator of products.

1.5 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and certificates from AWI and/or WI certification program indicating that woodwork, including installation, complies with requirements of grades specified.
- B. Grade: Custom.
- C. Type of Construction: Frameless.
- D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- E. Reveal Dimension: As indicated.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Wilsonart.
 - c. Nevamar
- G. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: [Grade HGS] [Grade HGL].
 - 2. Post-formed Surfaces: Grade GP-50.
 - 3. Vertical Surfaces: Grade GP-50.
 - 4. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- H. Materials for Semi-exposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade HGP.
 - 2. Drawer Sides and Backs: Solid-hardwood lumber.
 - 3. Drawer Bottoms: Hardwood plywood.
- I. Dust Panels: See: drawings.
- J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. See: drawings.
 - 2. Match Architect's sample.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: less than 19 percent at time of installation unless noted otherwise.
- B. Wood Sheet Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Plywood to receive plastic laminate shall be APA A-B interior; for semi-exposed surfaces APA A-D interior.
 - 2. Plywood for exposed painted millwork shall be APA A-D interior with rotary sliced birch veneer of medium density overlay.
 - 3. Plywood for exposed transparent finish millwork shall be AWI premium grade with select cherry veneer, plane sliced.
 - 4. Particleboard shall be three ply, matt-formed, 42.8 PCF minimum, filled faces.
 - 5. Hardboard shall be ¼" thickness, tempered.
 - 6. Plastic laminate shall meet NEMA LD3, grade GP-50 as manufactured by Formica, Nevamar, or Wilsonart; colors and patterns as selected by Architect.
 - 7. Exterior grade Veneer core Plywood shall be used at all sink locations. Plywood shall extend 4'-0" either side of sink.
 - 8. Veneer-Faced Panel Products Hardwood Plywood: HPVA HP-1.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
 - 1. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items noted otherwise.
 - 1. All hardware to be commercial grade.
 - 2. Pulls and knobs shall be shown on drawings.
 - 3. All drawer slides shall be accuride full extension.

- B. Butt Hinges: 2-3/4-inch (70-mm), five-knuckle steel hinges made from 0.095-inch- (2.4-mm-) thick metal, and as follows:
 - 1. Semi-concealed Hinges for Flush Doors: BHMA A156.9, B01361.
 - 2. Semi-concealed Hinges for Overlay Doors: BHMA A156.9, B01521.
- C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.
- D. Back-Mounted Pulls: BHMA A156.9, B02011.
- E. Wire Pulls: Back mounted, satin finished stainless steel (unless noted otherwise on drawings), 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter, 2-1/2 inches (63.5 mm) deep, and 5/16 inch (8 mm) in diameter.
- F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112. Unless noted otherwise on drawings.
- G. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.
- H. Drawer Slides: BHMA A156.9. Accuride full extension slides.
- I. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.
- J. Door Locks: BHMA A156.11, E07121. Unless noted otherwise on drawings.
- K. Drawer Locks: BHMA A156.11, E07041. Unless noted otherwise on drawings.
- L. Door and Drawer Silencers: BHMA A156.16, L03011. Unless noted otherwise on drawings.
- M. Float Glass for Cabinet Doors: ASTM C 1036, Type I, Class 1 (clear) Quality-Q3, 5.0 mm thick.
- N. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, with exposed edges seamed before tempering, 6 mm thick unless otherwise indicated.
- O. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.
- P. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated. Satin Stainless Steel: BHMA 630.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber or Fire-retardant-treated softwood lumber if to be used in a rated wall, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: low-VOC Contact cement.

2.6 FABRICATION

- A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- C. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- C. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- D. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
- E. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips or if hanging on metal stud walls, No. 10 wafer-head sheet metal screws through metal framing behind wall finish.

END OF SECTION 064116

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mildew-resistant joint sealants.
 - 2. Latex joint sealants.
- B. Product Data: For each joint-sealant product.

1.2 INFORMATIONAL SUBMITTALS

- A. Product Data: For each type of joint sealant product specified, including:
 - 1. Preparation instructions and recommendations.
 - 2. Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.
- B. Samples for Color Selection: For each joint sealant type.
- C. Samples for Verification: For each exterior joint sealant product, for each color selected.
- D. Warranty: Sample of unexecuted manufacturer and installer special warranties.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Company with minimum of three years experience specializing in work of this section, employing applicators trained for application of joint sealants required for this project, with record of successful completion of projects of similar scope, and approved by manufacturer.
- B. Single Source Responsibility: Provide exterior joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- C. Preconstruction Manufacturer Laboratory Compatibility, Staining, and Adhesion Testing: Submit samples of each substrate or adjacent material that will be in contact with or affect joint sealants. Current manufacturer test data of products on matching substrates will be acceptable.
 - 1. Adhesion: Use ASTM C 719 and ASTM C 794 to determine requirements for joint preparation, including cleaning and priming.
 - 2. Compatibility: Use ASTM C 1087 to determine materials forming joints and adjacent materials do not adversely affect sealant materials and do not affect sealant color.
 - 3. Stain Testing: Use ASTM C 510, ASTM C 1248, or ASTM D 2203 to verify non-staining characteristics of proposed sealants on specified substrates.
 - 4. Immersion Adhesion: Use ASTM C 1247 to determine performance of proposed immersed sealant in contact with [potable water] <insert liquid>.

5. Pre-construction manufacturer laboratory testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.
- D. Preconstruction Field-Adhesion Testing: Prior to installing joint sealants, field test adhesion to joint substrates using ASTM C 1193 Method A. Verify adhesion is adequate. Modify joint preparation recommendations for failed joints and re-test. Submit written test report.
 - E. Provide manufacturer's testing reports.
 - F. Mockups: Provide joint sealant application within 18"x18" mockups required by Architect identical to specified joint sealants and installation methods.
- 1.4 DELIVERY, STORAGE AND HANDLING
- A. Accept materials on site in manufacturer's unopened original packaging.
 - B. Store primers and sealants in dry location with ambient temperature range of 60 to 80 deg. F (15 to 27deg. C).
- 1.5 ENVIRONMENTAL REQUIREMENTS
- A. Do not install primers or sealants when atmospheric temperatures or joint surface temperatures are less than 40 deg. F (4 deg. C).
- 1.6 WARRANTY
- A. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or adhesive or cohesive failure under normal use within warranty period specified.
 1. Warranty Period for Silicone Sealants: Five years date of Substantial Completion.
 - B. Special Installer's Warranty: Original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
- C. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
- D. See section 072419 for additional sealants as recommended by EIFS manufacturer for exterior sealant applications.

2.3 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Do not use sealants of failed applications and notify Architect immediately for alternate selection.

3.4 JOINT-SEALANT SCHEDULE

- 1. Joint Sealant: Silicone T, NT
- 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal non-traffic surfaces
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between plant-precast architectural concrete units.
 - c. Control and expansion joints in unit masonry.
 - d. Joints in dimension stone cladding.
 - e. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, nonstaining NT
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non-traffic surfaces.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Vertical joints on exposed surfaces of unit masonry, concrete walls and partitions.
 - c. Other joints as indicated on Drawings.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non-traffic surfaces not subject to significant movement.
1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows and elevator entrances.
 2. Joint Sealant: Acrylic latex
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 2. Joint Sealant: Silicone, mildew resistant NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Concealed mastics.
1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Butyl-rubber based.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

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: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
1. Types of Storefront Systems include:
- Thermally broken Framing System – 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension; Thermal; Front, Center, Back, Multi-Plane, Structural Silicone or Weatherseal Glazed (Type B); Screw Spline, Shear Block, Stick or Punched Opening Fabrication.
- B. Related Sections:
- 079200 "Joint Sealants"
 - 088000 "Glazing"

1.3 Definitions

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 Performance Requirements

- A. Storefront System Performance Requirements:
- Wind loads: Provide storefront system to include anchorage capable of withstanding wind load design pressures (both inward and outward) for site area based on the International Building Code; 2012 Edition.
 - Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft² (0.3 l/s · m²) at a static air pressure differential of 6.24 psf (300 Pa).
 - Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.
 - Uniform Load: A static air design load of 35 psf (1680 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
 - Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
 - Glass to Exterior – 0.47 (low-e) or 0.61 (clear).
 - Glass to Center – 0.44 (low-e) or 0.61 (clear).
 - Glass to Interior – 0.41 (low-e) or 0.56 (clear).
 - Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
 - Glass to Exterior – 70_{frame} and 69_{glass} (low-e) or 69_{frame} and 58_{glass} (clear).
 - Glass to Center – 62_{frame} and 68_{glass} (low-e) or 63_{frame} and 56_{glass} (clear).
 - Glass to Interior – 56_{frame} and 67_{glass} (low-e) or 54_{frame} and 58_{glass} (clear).
 - Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:

- a. Glass to Center – 37 (STC) and 30 (OITC).
8. Windborne-Debris-Impact Resistance Performance: Shall be tested in accordance with ASTM E 1886, information in ASTM E 1996 and TAS 201/203.
 - a. Large-Missile Impact: For aluminum-framed systems located within 30 feet (9.1 m) of grade.
9. Blast Mitigation Performance: Shall be tested or proven through analysis to meet ASTM F1642, GSA-TS01, and UFC 04-010.01 performance criteria.

To meet UFC 04-010.01, B-3.1 Standard 10 for Windows and Skylights, the following options are available:

 - a. Section B-3.1.1 Dynamic analysis.
 - b. Section B-3.1.2 Testing.
 - c. Section B-3.1.3 ASTM F2248 Design Approach.

1.5 Submittals

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed storefront system indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
- D. Samples for Verification: For aluminum-framed storefront system and components required.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed storefront.
- F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
 1. Joinery.
 2. Anchorage.
 3. Expansion provisions.
 4. Glazing.
 5. Flashing and drainage.
- G. Other Action Submittals:
 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.6 Quality Assurance

- A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements". Do not modify size and dimensional requirements.
 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".
- G. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.
- H. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.7 Project Conditions

- A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.8 Warranty

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
 - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project.

PART 2 - PRODUCTS

2.1 Manufacturers

- A. Basis-of-Design Product:
 - 1. Thermally broken Framing System
 - 2. System Dimensions: 2" x 4-1/2" (50.8 mm x 114.3 mm)
 - 3. Glass: Center
- B. Subject to compliance with requirements, provide a comparable product by the following:
 - 1. Manufacturer:
 - a. YKK
 - b. Kawneer
- C. Substitutions: Refer to Substitutions Section for procedures and submission requirements
 - 1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
 - 2. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
 - 3. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefronts for a period of not less than ten (10) years. (Company Name)
 - 4. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
 - 5. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.
- D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

2.2 Materials

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.

- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Storefront Framing System

- A. Thermal Barrier:
 - 1. Thermal Break with a 1/4" (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
 - a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall be stainless steel.
- D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action
- E. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- F. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

2.4 Glazing Systems

- A. Glazing: As specified in Division 08 Section "Dynamic Glazing Systems" or "Glazing".
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
 - 1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
 - a. Color: To be chosen by Architect from manufacturer's standard range of colors.
 - 2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system

components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.

- a. Color: Matching structural sealant.

2.5 Entrance Door Systems

- A. Entrance Doors: Medium Stile with 10" bottom rail matching storefront system model type.
- B. Entrance Door Hardware: Match existing Entry door hardware and coordinate keying mechanisms with Owner's master keying system.

2.6 Accessory Materials

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants".
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

2.7 Fabrication

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fit joints; make joints flush, hairline and weatherproof.
 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 4. Physical and thermal isolation of glazing from framing members.
 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 6. Provisions for field replacement of glazing.
 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- D. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.
- E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 Aluminum Finishes

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
 1. (70% PVDF), AAMA 2605, Fluoropolymer Coating (Color chosen by Architect from manufacturer's standard range of color).

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 work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.
 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.

2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components.
- B. Install aluminum-framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum-framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 Field Quality Control

- A. Field Tests: The Owner may chose to have testing performed on the aluminum storefront system. In such case, the Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
 1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.
 - a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.
 - b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).

3.4 Adjusting, Cleaning, and Protection

- A. Clean aluminum surfaces immediately after installing aluminum-framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 084113

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Glass for doors, and Storefronts as described in the Drawings.
 - 2. Glazing sealants and accessories.

1.2 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

1.4 QUALITY ASSURANCE

- A. Provide testing data for each type of glazing and Sealant to be used by a qualified Testing Agency meeting the requirements as set forth in ASTM C 1021.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) Quality-Q3.

2.2 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's standard range.

2.3 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Provide spandrel glass where indicated and provide in color chosen by architect.
- I. Provide tempered glass as dictated in 2012 IBC and indicated on drawings.

3.2 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.3 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

END OF SECTION 088000

SECTION 092900 - GYPSUM BOARD

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. Interior gypsum board.
 - 2. Tile backing panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Moisture- and Mold-Resistant Assemblies: Provide and install moisture- and mold-resistant glass-mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C 1658 and ASTM C 1177 where indicated on Drawings and in all locations which might be subject to moisture exposure during construction. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- D. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Basis-of-Design Product: The design for each type of gypsum board and related products is based on Georgia-Pacific Gypsum products named. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corp.
 - 3. Lafarge North America Inc.
 - 4. National Gypsum Company.
 - 5. PABCO Gypsum.
 - 6. Temple-Inland.
 - 7. USG Corporation.
- B. Gypsum Wallboard: ASTM C 1396/C 1396M.
 - 1. Thickness: 1/2 inch.
 - 2. Long Edges: Tapered.
- C. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.
- D. Impact-Resistant Gypsum Board: ASTM C 1629/C 1629M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

- E. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. C-Cure; C-Cure Board 990.
 - b. James Hardie Building Products, Inc.; Hardiebacker.
 - c. National Gypsum Company, Permabase Cement Board.
 - d. USG Corporation; DUROCK Cement Board.
2. Thickness: 5/8 inch unless noted otherwise.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper.
 2. Exterior Gypsum Soffit Board: Paper.
 3. Exterior Glass Mat Gypsum Soffit: Fiberglass mesh.
 4. Glass-Mat Gypsum Wallboard: 10-by-10 fiberglass mesh.
 5. Glass-Mat Gypsum Sheathing Board: 10-by-10 fiberglass mesh.
 6. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats per manufacturer's recommendations.
- D. Joint Compound for Tile Backing Panels:
 1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 1. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick if not indicated by U.L. design descriptions.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pecora Corporation; AC-20 FTR, AIS-919.
 - b. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - c. USG Corporation; SHEETROCK Acoustical Sealant.
 2. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- G. Vapor Retarder: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant unless noted otherwise.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant unless noted otherwise.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 1. Wallboard Type: As indicated on Drawings.
 2. Type X: Where required for fire-resistance-rated assembly and throughout project.
 3. Ceiling Type: Type X Ceiling surfaces.
 4. Impact-Resistant Type As indicated on Drawings.
 5. Moisture- and Mold-Resistant Type: in wet locations such as sterile processing, sterilization rooms, toilets and janitor and housekeeping rooms.
- B. Single-Layer Application:
 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws unless noted otherwise.

- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at showers, tubs, and locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations unless noted otherwise.
- B. Cementitious Backer Units: ANSI A108.11, at showers, tubs, and locations indicated to receive tile.
- C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings and or according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. Bullnose Bead: Use at outside corners where indicated.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where indicated.
 5. U-Bead: Use at exposed panel edges and where indicated.
 6. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Install in all locations.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile, panels that are substrate for acoustical tile, where indicated on Drawings.
 - 3. Level 3: Where indicated on Drawings.
 - 4. Level 4: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
 - 5. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Tile backing panels.
3. Waterproof membrane.
4. Metal edge strips.

B. See Finish Schedule / Finish Notes on drawings for specific tile selections

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

C. Samples:

1. Each type and composition of tile and for each color and finish required.
2. Stone thresholds.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated unless noted otherwise.
 - a. See Finish Schedule / Finish Notes on drawings.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS

- A. Ceramic Tile Type: See Finish Schedule in Interior Design Package.
 - 1. Provide the following tile types as listed in the Finish Schedule / Notes:
 - a. External Corners for Thin-set Mortar Installations: As indicated in Finish Schedule.
 - b. Internal Corners: As indicated in Finish Schedule.
 - c. Tapered Transition Tile (if required by Finish Schedule / Notes): Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.
- B. Ceramic Tile manufacturers
 - 1. Manufacturers:
 - a. Trinity Surfaces
 - b. Specialty Tile
- C. Basis of Design: Trinity Surfaces' product as listed in the Finish Schedule on the Drawings is the basis of design and preferred product. Specialty Tile product listed in the Finish Schedule is another acceptable product.

2.3 BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A.
 - 1. Use cementitious backer units from one of the following manufacturers:
 - a. James Hardie
 - b. USG
 - 2. Thickness: 1/2 inch unless noted otherwise.
- B. Fiber-Cement Backer Board: ASTM C 1288.
 - 1. Use cementitious backer units from one of the following manufacturers:
 - a. James Hardie
 - b. USG

2. Thickness: 1/2 inch unless otherwise noted.

2.4 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

2.5 SETTING MATERIALS (see Finish Schedule for tile types and locations used in project)

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
- B. Standard Dry-Set Mortar (Thin-set): ANSI A118.1.
 1. For wall applications, provide non-sagging mortar.
- C. Modified Dry-Set Mortar (Thin-set): ANSI A118.4.
 1. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
 2. For wall applications, provide non-sagging mortar.
- D. Improved Modified Dry-Set Mortar (Thin-set): ANSI A118.15.
 1. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
 2. For wall applications, provide non-sagging mortar.
- E. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.
- F. Organic Adhesive: ANSI A136.1, Type I.
- G. Use setting materials as recommended by ceramic tile manufacturer for specific tile uses.

2.6 GROUT MATERIALS

- A. Use one of the following grout types unless otherwise noted:
 1. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
 2. High-Performance Tile Grout: ANSI A118.7.
 - a. Polymer Type: Dry, re-dispersible form, prepackaged with other dry ingredients.
 - b. Polymer Type: Liquid-latex form for addition to prepackaged dry-grout mix.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips (where indicated or recommended): Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material unless noted otherwise.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives, or thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.

- c. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths or as recommended by tile manufacturer:
 - 1. Ceramic Mosaic Tile: 1/16 inch.
 - 2. Quarry Tile: 1/4 inch.
 - 3. Glazed Wall Tile: 1/8 inch.
 - 4. Porcelain Tile: 1/4 inch.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- J. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
 - 1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in modified dry-set mortar (thin-set).
 - 2. Do not extend cleavage membrane, waterproofing or crack isolation membrane under thresholds set in modified dry-set mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane, waterproofing or crack isolation membrane with elastomeric sealant.
- K. Metal Edge Strips: Install at locations indicated, where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile, or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- L. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors (unless noted otherwise) according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

- M. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.
- N. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- O. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

END OF SECTION 093013

SECTION 095123 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustical tiles for interior ceilings.

1.2 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.
- C. Delegated-Design Submittal: For seismic restraints for ceiling systems.
 - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.
- B. Product test reports.
- C. Research reports.
- D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for ceiling systems.
- B. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A, B, or C according to ASTM E 1264.
 - 2. Smoke-Developed Index: 50 or less unless noted otherwise.

2.2 ACOUSTICAL TILES

- A. Acoustical Tile Standard: Manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264.
- B. Classification: See Finish Schedule / Finish Notes on drawings.
- C. Color: See Finish Schedule / Finish Notes on drawings.
- D. Edge/Joint Detail: See Finish Schedule / Finish Notes on drawings.
- E. Thickness: See Finish Schedule / Finish Notes on drawings.
- F. Modular Size: As indicated on Drawings.
- G. Manufacturers"
 - 1. Armstrong World Industries
 - 2. USG
- H. Basis of Design: Armstrong is the basis of design. Armstrong products listed on Finish Schedule on Drawings is the preferred product.

2.3 METAL SUSPENSION SYSTEM

- A. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, fully concealed, metal suspension system that complies with applicable requirements in ASTM C 635/C 635M.
- B. Direct-Hung, Double-Web Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation.
 - 1. Structural Classification: Heavy-duty system.
 - 2. Access: Upward with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical tiles.

- a. Initial Access Opening: In each module, As indicated on Drawings.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical tiles in-place during a seismic event.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for of suspension-system runners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustical tile ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical tiles.
 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- C. Arrange directionally patterned acoustical tiles as indicated on reflected ceiling plans.

END OF SECTION 095123

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

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. Resilient base.
 - 2. Resilient stair accessories.
 - 3. Resilient molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches (300 mm) long.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches (300 mm) long.
- E. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than [10 linear feet (3 linear m)] <Insert dimension> for every [500 linear feet (150 linear m)] <Insert dimension> or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 THERMOSET-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Johnsonite, (a member of the Tarkett Group)
 - 2. Flexco.
 - 3. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 1. Style and Location:
 - a. Style B, Cove.
- C. Thickness: 0.125 inch (3.2 mm).

Coordinate height retained in "Height" Paragraph with length retained in "Lengths" Paragraph below; some manufacturers do not offer coils for every height.

- D. Height: 4 inches (102 mm).
- E. Lengths: Coils in manufacturer's standard length.

- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Colors: As selected by Architect from full range of industry colors.

Retain "Colors" Paragraph below if colors are not indicated in a separate schedule.

- I. Colors: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from full range of industry colors] <Insert colors>.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
 - 2. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Metal Edge Strips (if used): Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.
- D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than [9] [10] <Insert number> pH.
 - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are the same temperature as the space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 1. Remove adhesive and other blemishes from exposed surfaces.
 2. Sweep and vacuum horizontal surfaces thoroughly.
 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish as directed by manufacturer's recommendations.
 1. Apply coats per manufacturers recommendations..
- E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Solid vinyl floor tile.
 2. Rubber floor tile.
 3. Vinyl composition floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
1. Show details of special patterns.
- C. Samples: Full-size units of each color and pattern of floor tile required.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Provide testing information for the specified resilient tile flooring. Testing to have been performed in accordance with ASTM E 648 or NFPA 253 by a qualified testing agency.
1. Critical Radiant Flux Classification: Radiant Flux / ASTM E 648 >0.45 watts/cm², NFPA .
 2. Smoke Density / ASTM E 662
- B. Performance Testing:
1. Slip Resistance / ASTM D 2047 >0.65
 2. Residual Indentation / ASTM F 970 1500 psi (lbs/sq in)
 3. Flexibility / ASTM F 137 Passes
 4. Resistance to Heat / ASTM F 1514 Passes

5. Resistance to Light / ASTM F 1515 Passes
6. Resistance to Chemicals / ASTM F 925 Passes
7. Resistance to Fungi / ASTM G21 Passes
8. Antibacterial Activity / AATCC 147 Passes

2.2 SOLID VINYL FLOOR TILE

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. Patcraft.
 2. Shaw Contract Group; a Berkshire Hathaway company.
 3. Mohawk
- B. Basis of Design: Patcraft product listed in the Finish Schedule on the Drawings, is the basis of design and the preferred product. See Finish Schedule for acceptable products and manufacturers.
- C. Tile Standard: ASTM F 1700.
 1. Class: Class I, vinyl flooring.
 2. Type: B, embossed surface.
- D. Size: See Finish Legend in drawings.
- E. Colors and Patterns: As indicated in the Finish Legend in drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
 4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours unless noted otherwise by manufacturer.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level unless noted otherwise by manufacturer.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are the same temperature as the space where they are to be installed. Acclimation period must be 48 hours minimum.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 1. Lay tiles in pattern indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 1. See finish notes on drawings.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.3 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
 - 1. Apply two coats.
- C. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile.

1.2 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

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

- B. Shop Drawings: For carpet tile installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

- C. Samples: For each exposed product and for each color and texture required.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Master II certification level.

1.7 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Patcraft; a division of Shaw Industries, Inc
 - 2. Mohawk Group (The); Mohawk Carpet, LLC.
- B. Color: See Finish Schedule / Finish Notes in drawings.
- C. Pattern: See Finish Schedule / Finish Notes in drawings.
- D. Fiber Content: 100 percent nylon.
- E. Fiber Type: Solution Q Extreme Nylon.
- F. Pile Characteristic: Multi-level pattern loop pile.
- G. Density: 6698 oz./cu. yd.
- H. Pile Thickness: 0.129" according to ASTM D 6859.
- I. Stitches: 11.8 stitches per inch.
- J. Gage: 1 1/2 per inch.
- K. Surface Pile Weight: 24.0 oz./sq. yd.
- L. Primary Backing/Backcoating: Non-woven synthetic.
- M. Secondary Backing: EcoWorx Tile.
- N. Backing System: EcoWorx Tile.
- O. Size: 24 by 24 inches.
- P. Applied Treatments:
 - 1. Soil-Resistance Treatment: Severe (TARR)
 - 2. Antimicrobial Treatment: Protects carpet tiles as follows:
 - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

Q. Performance Characteristics:

1. Appearance Retention Rating: Severe traffic, 3.5 minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. according to NFPA 253.
3. Dry Breaking Strength: Not less than 100 lbf (445 N) according to ASTM D 2646.
4. Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.
5. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
6. Noise Reduction Coefficient (NRC): <Insert NRC> according to ASTM C 423.
7. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
8. fading units) according to AATCC 16, Option E.
9. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Concrete Slabs:
 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m (unless noted otherwise by manufacturer's installation instructions) and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- B. Wood Subfloors: Verify that underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- C. Metal Subfloors: Verify that underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- D. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns as directed by Finished Schedule / Finish Notes on drawings.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, non-staining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- J. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 096816 - SHEET CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Carpet
2. Carpet cushion.

1.2 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

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

- B. Shop Drawings: For carpet installation, showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
2. Carpet type, color, and dye lot.
3. Locations where dye lot changes occur.
4. Seam locations, types, and methods.
5. Type of subfloor.
6. Type of installation.
7. Pattern type, repeat size, location, direction, and starting point.
8. Pile direction.
9. Types, colors, and locations of insets and borders.
10. Types, colors, and locations of edge, transition, and other accessory strips.
11. Transition details to other flooring materials.
12. Type of carpet cushion.

- C. Samples: For each exposed product and for each color and texture required.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

- B. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II certification level or as recommended by manufacturer.

1.7 WARRANTY

- A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Warranty for Carpet Cushion: Manufacturer agrees to repair or replace components of carpet cushion installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WOVEN CARPET

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Patcraft
 - 2. Mohawk Group (The); Mohawk Carpet, LLC
 - 3. Shaw Flooring
- B. Patcraft Carpet listed on Finish Schedule is basis of design and preferred product.
 - 1. See Finish Schedule for acceptable products from other manufacturer's listed above.
- C. Color: As indicated on Finish Schedule in Construction Documents.
- D. Pattern: As indicated on Finish Schedule in Construction Documents.
- E. Fiber Content: 100 percent Nylon
- F. Gauge: 1/12.
- G. Backing: per manufacturer's recommendation for each carpet product listed in finish schedule.
- H. Applied Treatments:
 - 1. Applied Soil-Resistance Treatment: Sentry or equal per manufacture's recommendations.
- I. Performance Characteristics:

1. Appearance Retention Rating: Severe traffic, minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253 (class I for Commercial)
3. Static: Less than 3.5 kV according to AATCC 134.

2.2 CARPET CUSHION

- A. Provide carpet cushion from same source as carpet or as recommended by carpet manufacturer. Use carpet type designations on Drawings to identify each product.
- B. Traffic Classification: CCC Class III, extra-heavy traffic.
- C. Performance Characteristics:
 1. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet and or carpet cushion manufacturer whichever is more stringent.
- B. Adhesives: Water-resistant, mildew-resistant, non-staining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet and or carpet cushion manufacturers.
- C. Tackless Carpet Stripping: Any Carpet Stripping used shall be water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI's "Carpet Installation Standard."
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Concrete Slabs:
 1. Moisture Testing: Perform tests so that each test area does not exceed carpet, carpet backing and adhesive manufacturer (s) recommendations and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
- B. Wood Subfloors: Verify that underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard" and with carpet manufacturer's written installation instructions for preparing substrates.

- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive, carpet, and carpet cushion manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 CARPET INSTALLATION

- A. Comply with CRI's "CRI Carpet Installation Standard" and carpet and carpet cushion manufacturers' written installation instructions for the following:
 - 1. Direct-glue-down installation.
 - 2. Double-glue-down installation.
 - 3. Carpet with attached-cushion installation.
 - 4. Preapplied adhesive installation.
 - 5. Hook-and-loop installation.
 - 6. Stretch-in installation.
 - 7. Stair installation.
- B. Comply with carpet manufacturer's written instructions and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
 - 1. Stretch-in Carpet Installation: Install carpet cushion seams at 90-degree angle with carpet seams.
- C. Install as indicated on Drawings or as directed by Interior Designer.
- D. Install borders with mitered corner seams.
- E. Do not bridge building expansion joints with carpet.
- F. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- G. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, non-staining marking device.
- I. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by carpet manufacturer and carpet cushion and adhesive manufacturers.

END OF SECTION 096816

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vinyl wall covering.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

- B. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36-inch x 36-inch long in size.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 195 or less ANSI 2.5, NFPA 255, UBC 42-1 AND U.L. 723.
2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265.

2.2 VINYL WALL COVERINGS

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

1. Eykon Design Resources.
 - a. National
 - b. MDC
 2. MDC.
 - a. National
 - b. Eykon
- B. Basis of Design: Eykon (WC-1) and MDC (WC-2) are the basis of design for each wallcovering type and the preferred product. Manufacturer's listed below each wallcovering type and as listed in the Finish Schedule on the Drawings (with their respective products), are acceptable manufacturers and products.
- C. Description: Provide products specified in Finish Schedule in rolls from same production run and complying with the manufacturer's written recommendations and as indicated in the drawings.
- D. Colors, Textures, and Patterns: See Finish Schedule in drawings.
- E. Class: Class I

2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, non-staining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 099123 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects as recommended by product manufacturer. If manufacturer does not list recommendations then follow recommendations below:
 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 3. Metals: If not factory primed, clean and apply primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 4. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 5. Painted Surfaces: Treat areas susceptible to pigment bleeding.

- D. Check painted surfaces for pigment bleeding. Sand gloss, semi-gloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas as recommended in writing by product manufacturer before installation.

3.2 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- F. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- G. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- H. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete masonry units (CMUs).
 - 2. Fiber Cement Board
 - 3. Wood
 - 4. Gypsum board
 - 5. Cementitious Roofing Boards
 - 6. Concrete: 12 percent.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of paint system and in each color and gloss of topcoat.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 80 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. All Paints are to be from a single source manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Sherwin Williams
- B. Benjamin Moore
- C. PPG

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As indicated in color schedules included in the drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Fiber-Cement Board: 12 percent.
 - 2. Masonry (Clay and CMUs): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 INTERIOR PAINTING SCHEDULE

- A. See Interior Designer's Package for interior paint schedule.
- B. Gypsum Board Substrates:
 - 1. Latex over Latex Sealer System MPI INT 9.2A:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - 1) Color: See Finish Legend in drawings.
 - 2) Manufacturer:
 - a) Sherwin Williams
 - b) Benjamin Moore
 - c) PPG
- b. Prime Coat: Latex, interior, matching topcoat.
- c. Intermediate Coat: Latex, interior, matching topcoat.
- d. Topcoat: Latex, interior. See Finish Legend for sheen.

C. CMU Substrates:

- 1. Institutional Low-Odor/VOC Latex System:
 - a. Block Filler: Block filler, latex, interior.
 - 1) Color: See Finish Schedule
 - 2) Manufacturer:
 - a) Sherwin Williams
 - b) Benjamin Moore
 - c) PPG Paints

D. Galvanized metals (railings).

- 1. High-Performance Architectural Latex System MPI INT 5.3M:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.
 - 1) Color: See Finish Schedule
 - 2) Manufacturer:
 - a) Sherwin Williams
 - b) Benjamin Moore
 - c) PPG Paints

E. Concrete Substrates, Horizontal Surfaces:

- 1. Epoxy Non-Slip Deck Coating System MPI EXT 3.2C:
 - a. Prime Coat: As recommended in writing by topcoat manufacturer.
 - b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
 - c. Topcoat: Epoxy deck coating (slip resistant), MPI #82.
 - 1) Color: See Finish Schedule
 - 2) Manufacturer:
 - a) Sherwin Williams
 - b) Benjamin Moore
 - c) PPG Paints

END OF SECTION 099123

SECTION 107300 - EXTRUDED ALUMINUM CANOPY SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

- A. The bidding requirements, general conditions, supplementary conditions, drawings and requirements of division one specification shall apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

- A. The extent of aluminum canopy is shown on the drawings and as specified herein.
- B. Definition: Extruded Aluminum Canopy shall consist entirely of extruded aluminum sections (roll-formed not acceptable). System shall consist of heli-arc welded, one-piece rigid structural beam assemblies, decking, fascia, accessory items and hardware to provide a complete system.
- C. Water shall drain from deck into designated beams and out at either guttering at front or back of canopy or at grade level by way of aluminum gutters provided by others.

1.3 SUBMITTALS

- A. Shop Drawings: Submit detailed drawings, layout of canopy system, beam locations (identify drains and wet beams), all mechanical joint locations with complete details, connections, jointing and accessories. Include details of beam anchorage.
- B. Product Data: Submit manufacturer's product data, specifications, component performance data and installation instructions.
- C. Calculations: Provide signed and sealed structural calculations for the proposed walkway cover, by a professional engineer registered in the state of Georgia, who professes his discipline to be structural engineering.

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following except as otherwise indicated.
 - 2012 Standard Building Code, latest addition with amendments.
 - AWS (American Welding Society) standards for structural aluminum welding.
- B. Manufacturer: Obtain aluminum canopy system from only one (1) manufacturer, although several may be indicated as offering products complying with requirements.
- C. Installer Qualification: Firm with not less than three (3) years of experience in installation of aluminum walkway covers of type, quantity and installation methods similar to work of this section.

- D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work. However, allow for adjustments within specified tolerations wherever taking of field measurements before fabrication might delay work.
- E. Shop Assembly: Pre-assemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- F. Coordination: Coordinate work of this section with work of other sections which interface with canopy system. (sidewalks, curbs, building fascias, etc.).

1.5 PERFORMANCE REQUIREMENTS:

- A. System Performance: Provide aluminum canopy system that has been designed, produced, fabricated and installed to withstand normal temperature changes as well as live loading, dead loading and wind loading in compliance with Standard Building Code requirements for geographic area in which work is located.
- B. Sizes shown on drawings are to be considered minimum.
- C. Structure shall be capable of sustaining severe icing, hail, hurricane force winds and supporting a concentrated load such as being walked upon.

PART 2 PRODUCT

2.01 ACCEPTABLE MANUFACTURERS

- A. DITT-DECK Extruded Aluminum Walkway Cover System by Dittmer Architectural Aluminum is specified as the basis of design.
 - 1. DITT-DECK
 - 2. MAPES
- B. Equivalent systems by other manufacturers will be approved by addendum provided the following are submitted ten (10) days prior to bid opening and are complete:
 - 1. Submit evidence of having operated a successful business of manufacturing and installing complete extruded aluminum walkway cover systems.
 - b. Business must have been in operation under submitted name and ownership for a minimum of ten (10) years.
 - c. Submit a list of successfully completed projects of similar scope, size and complexity within the state of Georgia. List shall include job name, date of completion, architect's firm name, address and phone number, owner's name with representative and phone number.
 - d. Submit complete shop drawings for above completed jobs.
 - e. Submit complete details with structural properties (moment of inertia, section modules, modules of elasticity, etc.) for all proposed sections (beams, columns, decking and other structural members).

2.02 MATERIALS

- A. All aluminum extrusions shall be alloy 6063 heat treated to a T-6 temper.
- B. Standard finish for all components shall be satin anodize meeting Aluminum Association Specification AA-M-10C-22A-21 minimum.
- C. Fasteners:
 - 1. Deck Screws (rivets not permitted): Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8" outside dimension, conical washer.
 - 2. Fascia Rivets: Size 3/16" by 1/2" grip range aluminum rivets with aluminum mandrel.
 - 3. Bolts: All bolts, nuts and washers to be 18-8 non-magnetic stainless steel.
 - 4. Tek Screws: not permitted.
- D. Warranty:
 - 1. Manufacturer shall warrant the entire system against defects in labor and materials for a period of one (1) year commencing on the date of substantial completion as established in Division One of these specifications.
 - 2. Intention of this warranty is the manufacturer will come onto the jobsite and do all necessary to effect corrections of any deficiencies.
 - 3. Prima Facie Evidence of defects in labor and material may include but is not limited to, one or more of the following:
 - a. Moisture Leaks
 - b. Metal failure including excessive deflection
 - c. Fastener failure
 - d. Finish failure

2.03 FABRICATION

- A. Comply with indicated profiles, dimensional requirements and structural requirements.
- B. Use sections true to details with clean, straight sharply defined profiles and smooth surfaces of uniform color and texture, free from defects impairing strength and durability.
- C. All welding to be done by heli-arc process.
- D. Beams shall consist of shop welded one piece units.
- E. Mechanical joints shall consist of stainless steel bolts with a minimum of two (2) bolts per fastening. Bolts and nuts shall be installed in a concealed manner utilizing 1/2" thick by 1 1/2" aluminum bolt bars welded to structural members. All such mechanical joints must be detailed on shop drawings showing all locations.
- F. Roof Deck: Extruded aluminum shapes, interlocking self-flashing sections. Shop fabricate to lengths and panel widths required for field assembly. Depth of sections to comply with structural requirements. Provide shop induced camber in deck units with spans greater than 16'-0" to offset dead load deflections. Internal dams are to be used at non-draining ends of deck.
- G. Expansion joints, design structure for thermal expansion and contraction. Provide expansion joints as required.

- H. Exposed rivets used to fasten bottom of fascia to deck to have finish to match fascia.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING:

- A. Deliver, store and handle canopy system components as recommended by manufacturer. Handle and store in a manner to avoid deforming members and to avoid excessive stresses.

3.02 EXAMINATION

- A. Examine adjacent work for conditions that would prevent quality installation of system.
- B. Do not proceed until defects are corrected.

3.03 CONCRETE FOOTINGS

- A. Sleeves (styrofoam blockouts) shall be furnished by canopy manufacturer and placed by general contractor.

3.04 FIELD DIMENSIONS

- A. General contractor shall field confirm bent locations, dimensions and elevations shown on shop drawings prior to fabrication.

3.05 INSTALLATION

- A. Erection: Set canopy support frames into pockets provided in wall; set to required elevations, align, plumb, and level; and grout in place with 2,000 p.s.i. portland cement grout unless another attachment system is either indicated on the drawings or recommended by the engineer.
- B. Install canopy deck sections, accessories and related flashing in accordance with manufacturer's instructions. Provide canopy slope for rain drainage without ponding water. Align and anchor canopy deck units to structural supports.
- C. Assemble all components in a neat, workmanlike manner.

3.06 FLASHING

- A. Flashings: Flashing required between canopy system and adjoining structures are not work of this section. Refer to "Flashing and Sheet Metals", Section 076200.

3.07 CLEANING AND PROTECTION

- A. Damaged Units: Replace roof deck panels and other components of the work which have been damaged or have deteriorated beyond successful minor repair.
- B. Cleaning: Remove protective coverings at time in project construction sequence which will afford greatest protection of work. Clean finished surfaces as recommended by manufacturer. Maintain in a clean condition during construction.

C. Protection: Advise Contractor of protection and surveillance procedures, as required to ensure that work of this section will be without damage or deterioration at time of substantial completion.

END OF SECTION 107300

SECTION 122200 - CURTAINS AND DRAPES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Drapes.
 - 2. Drapery tracks.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Drapery Tracks: Include maximum weights of drapes that can be supported.
- B. Sustainable Design Submittals:
- C. Shop Drawings:
 - 1. Drapery Tracks: Show installation and anchorage details and locations of controls.
 - 2. Drapes: Show sizes, locations, and details of installation.
- D. Samples: As follows:
 - 1. Drapery Tracks: 18 inches (450 mm) long, with carriers, controls, and accessories.
 - 2. Drapery Fabrics: For each color and pattern indicated, full width by 36 inches (1000 mm) long, from dye lot to be used for the Work and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.
 - 3. Textile Trims: For each color and pattern indicated, 18 inches (450 mm) long.
 - 4. Drape Fabrication: For each heading, fabric, color, and pattern indicated, a complete full-size panel to verify details of fabrication and thread colors.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For drapery track installation; reflected ceiling plans drawn to scale and coordinating track installation with openings and ceiling-mounted items.
- B. Product certificates.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: For drapes and drapery tracks, fabricator of drapes.

PART 2 - PRODUCTS

2.1 DRAPES

- A. Manufacturers:
1. ARC COM
 2. EYKON
- B. Basis of Design: ARC COM and it's product, as listed in the Finish Schedule on the Drawings, is the preferred manufacturer and product.
- C. Source Limitations: Obtain each color and pattern of drapery fabric and trim from one dye lot.
- D. Fire-Test-Response Characteristics: For fabrics treated with fire retardants, provide products that pass NFPA 701 as determined by testing of fabrics that were treated using treatment-application method intended for use for this Project by a testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Drape.
1. Drapery Fabric: 100% Polyester
 2. Class: Class I
 3. Product: See Finish Schedule on Drawings.

PART 3 - EXECUTION

3.1 DRAPE INSTALLATION

- A. Where drapes abut overhead construction, hang drapes so that clearance between headings and overhead construction is 1/4 inch (6.4 mm).
- B. Where drapes extend to floor, install so that bottom hems clear finished floor by not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm).
- C. Where drapes extend to windowsill, install so that bottom hems hang above sill line and clear sill line by not more than 1/2 inch (13 mm).
- D. After hanging drapes, do the following:
1. Test and adjust each drapery track to produce unencumbered, smooth operation.
 2. Steam and dress down drapes as required to produce crease- and wrinkle-free installation.
 3. Remove and replace drapes that are stained or soiled.

END OF SECTION 122200

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Solid surface material countertops.
 2. Solid surface material backsplashes.
 3. Solid surface material end splashes.
 4. Solid surface material apron fronts.
 5. Solid surface material sinks.

1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials[**and sinks**].
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DuPont
 - b. LG Haulsys
 2. Type: Provide Standard type
 3. Integral Sink Bowls: Comply with CSA B45.5/IAPMO Z124.
 4. Colors and Patterns: See Finish Schedule / Finish Notes on drawings or equal chosen by Architect from manufacturer's full range of selections.
- B. Particleboard: ANSI A208.1,Grade M-2-Exterior Glue low VOC.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Custom.
- B. Configuration:
 1. Front: Straight, slightly eased at top.
 2. Backsplash: Straight, slightly eased at corner.
 3. End Splash: Matching backsplash.
- C. Countertops: 3/4-inch- (19-mm-) thick, solid surface material with front edge built up with same material unless noted otherwise on millwork sections.
- D. Backsplashes: 3/4-inch- (19-mm-) thick, solid surface material.
- E. Joints: Fabricate countertops without joints.
- F. Cutouts and Holes:
 1. Under-counter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer. Low VOC.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions.
- D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive.
- F. Install aprons to backing and countertops with adhesive.
- G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- H. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

SECTION 123661.19 - QUARTZ AGGLOMERATE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Quartz agglomerate countertops.
 2. Quartz agglomerate backsplashes.
 3. Quartz agglomerate end splashes.
 4. Quartz agglomerate apron fronts.

1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 QUARTZ AGGLOMERATE COUNTERTOP MATERIALS

- A. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with ICPA SS-1, except for composition.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Consentino (Silestone)
 - b. DuPont
 - c. LG Haulsys
 2. Colors and Patterns: See Finish Schedule / Finish Notes on drawings.
- B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to quartz agglomerate manufacturer's written instructions and the AWI/AWMAC/WI's "Architectural Woodwork Standards."
1. Grade: Custom.
- B. Configuration:

1. Front: Straight, slightly eased at top
 2. Backsplash: [Straight, slightly eased at corner.
 3. End Splash: Matching backsplash.
- C. Countertops: 3/4-inch- (19-mm-) thick, quartz agglomerate with front edge built up with same material.
- D. Backsplashes: 3/4-inch- (19-mm-) thick, quartz agglomerate with wood-trimmed edges.
- E. Joints: Fabricate countertops without joints.
- F. Cutouts and Holes:
1. Under-counter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Low VOC product recommended by quartz agglomerate manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Secure countertops to subtops with adhesive according to quartz agglomerate manufacturer's written instructions.
- D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive.
- F. Install aprons to backing and countertops with adhesive.
- G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- H. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.19

SECTION 215250
FIRE PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Rework existing sprinkler system to provide a complete, hydraulically calculated, sprinkler system including piping and heads.
- b. Refer to specification 230100 for additional general requirements.

1.02 QUALIFICATIONS:

- A. The fire protection system shall be designed by a licensed fire protection designer.
- B. The fire protection work shall be accomplished by workmen experienced in the installation of fire protection sprinkler systems.
- C. The organization selected to design & install the systems shall have a minimum of five (5) years continuous practice in the exclusive business of design and installation of sprinkler systems. Submit qualifications prior to submittal of shop drawings.

1.03 BASIS OF DESIGN:

- A. Hazard Classification: Ordinary Hazard.

1.04 SHOP DRAWINGS:

- A. Prepare shop drawings including hydraulic calculations for the sprinkler system in accordance with NFPA-13. Protect all spaces of the building, including concealed ceiling and truss spaces.
- B. The drawings issued with these specifications are for bid purposes only and are generally diagrammatic, not showing hangers, offsets, etc. required. Coordinate the design of the system closely with the HVAC, Plumbing and Electrical systems to avoid interference with other systems. Review drawings to ensure that the fire protection system will be concealed above ceilings.
- C. Shop drawings and calculations shall show details of the sprinkler system installation as they pertain to the specific building, NFPA-13, and the local governing authority. Submit copies of shop drawings and calculations to the local governing authorities for review before submitting to the Architect. Submit six (6) copies of shop drawings to Architect for review. One copy of the shop drawing shall have stamp and comments from the local governing authority.

1.05 INSPECTION AND TESTS:

- A. Conduct approval tests as listed in NFPA-13. Submit reports of tests to the Architect. The Architect or his representative may inspect the equipment, piping, etc., at any time during installation.

Comment [COMMENT1]: Use this spec for simple, wet systems, with no fire pumps, or compressors. See C:\WP\MECH.SP\MORE\15500 for other options

Comment [COMMENT2]: Check to see if "dry" system is required. If srpinkler piping runs through attic, or if building is wood structure, dry system is probably required.

PART 2 - MATERIALS

2.01 MATERIALS AND INSTALLATION:

- A. Use only materials, sprinkler devices, pipe, fittings, valves, hangers, etc. which are new and on the approved or acceptable list of the current issue of inspected fire protection equipment and materials as published by the FIA, FM or U.L.
- B. Install system in accordance with NFPA-13 and NFPA-24.

2.02 SPRINKLER HEADS:

- A. Rating: 165⁰F.
- B. Sprinklers in suspended ceilings:
 - 1. Semi-recessed, pendant type
 - 2. White finish, and matching escutcheon.

Locate heads in center of tile or on quarter points in the long direction of tiles.

- C. Sprinklers in areas without ceilings:
 - 1. Standard upright type
 - 2. Chrome plated finish.
- D. Sidewall type sprinklers
 - 1. Standard horizontal sidewall type
 - 2. White finish with matching escutcheon.

2.03 PIPE AND FITTINGS:

- A. Above ground piping inside of buildings shall conform to the requirements of NFPA No. 13. Piping shall be metal; no plastic piping is acceptable. Indicate on the shop drawings the type of pipe and jointing selected for use, and submit catalog cuts or letters from manufacturers of all pipe and fittings, certifying compliance with the standards defined in NFPA 13.
- B. Piping 2" and larger shall be schedule 10 black steel with roll grooved Victaulic or equal joints. The use of lightwall piping such as "Allied XL/BLT" is not acceptable.
- C. Piping smaller than 2" shall be schedule 40 steel with threaded joints and malleable iron fittings.

2.04 CUTTING, PATCHING, CARPENTRY AND MASONRY WORK:

- A. Do all cutting, patching, carpentry, and masonry work required for the installation, conforming to the surrounding surfaces in every respect, including painting, tiling, etc. No cutting or patching shall be performed without first obtaining approval of the Architect and cutting patching of new concrete or masonry will not be permitted unless absolutely necessary.

2.05 PIPE HANGERS, SLEEVES, WALL AND CEILING PLATES:

- A. Support piping in accordance with the Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS) Standard Practice SP-58, SP-69, latest edition, and NFPA requirements.
- B. Hangers and supports shall be capable of vertical adjustment under load. All rods shall have double locknuts. Hangers and supports shall be carbon steel, malleable iron, or cast iron; copper plated or insulated with rubber, neoprene, or sheet lead gaskets for copper pipe and tubing. hangers and supports of chain, strap, gray cast iron, or wire will not accepted.
- C. Hanger rings:
 - 1. Pipe 3 inch and smaller: adjustable, Grinnell Figure No. 101.0.
 - 2. Pipe 3-1/2 inch and larger: adjustable, Grinnell Company's Figure No. 101 or 260.
- D. Beam clamps for supporting branch lines:
 - 1. Piping 4 inch and smaller: Grinnell No. 83, 86, 94, or 227.
 - 2. Piping 5 inch to 8 inch: Grinnell Figure No. 225, 226 or 270.Use beam clamps where piping is supported from building structure.
- E. Do not punch or drill structure, except for support of piping. Provide supplementary steel for intermediate hangers as required.
- F. Indicate on working drawings the type and location of hangers proposed for use for the support of branch lines and mains under the differenet types of roof and ceiling construction.
- G. Provide wall and ceiling plates with set screws whenever pipes pass through walls or ceilings.
- H. Sleeves shall be as specified in Section 15060, PIPING.

PART 3 - EXECUTION

3.01 REQUIREMENTS:

- A. Install in accordance with NFPA-13 and NFPA-24.
- B. Pitch all pipe for drainage and provide drain valves at low points.

- C. Thoroughly flush new water connections before connecting to the sprinkler system riser. Provide necessary pipe, hose, etc., to discharge the water so that it will not damage buildings or surrounding property.

3.02 TESTS:

- A. Perform tests as required by standards listed and prepare report of tests as required by standards.

END OF SECTION

Comment [COMMENT3]: IF THERE IS REALLY A CHANCE OF FREEZING, MAKE SYSTEM DRY TYPE

SECTION 224000

PLUMBING

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Include all necessary apparatus, excavating, controls, valves, and fittings required for a complete sanitary plumbing system.
- B. Refer to specification 230100 for additional general requirements.

1.02 UTILITIES AND SERVICES:

- A. Sanitary: Provide sanitary drainage, connect to sewer.
- B. Water: Provide domestic water, connecting to water mains.

1.03 TESTS:

- A. Test the plumbing system as required by the applicable plumbing code.
- B. Test water piping for a continuous period of not less than four hours at a hydrostatic pressure of not less than one hundred twenty-five (125) pounds and make free from leaks. Completely remake leaky joints with piping dry. Retest system after leaks are corrected.
- C. Plug all necessary openings in the drainage and vent piping systems fill the entire system with water to the level of the highest vent stack above the roof. The system shall hold this water for 30 minutes without showing a drop in water level greater than 4 inches. Subject to approval of the Architect the drainage system may be tested in sections.

1.04 STERILIZATION:

- A. Disinfect the potable water system in accordance with the Plumbing Code. After disinfection, send water samples to the Local Health Department for testing. Obtain approval of the Local Health Department before the system is placed into service.
- B. Unless the Local Health Department requires otherwise, disinfect potable water piping upon completion of installation by a mixture containing not less than 0.6 pound of high test calcium hypochlorite, or 2 pounds of chlorinated lime to each 1000 gallons of water to provide not less than 50 ppm of available chlorine. Inject the mixture into the system and retain for not less than 24 hours, at which time the chlorine level shall be at 10 ppm or greater. Then drain the system and flush with potable water until only a normal chlorine residual remains (.2 ppm).

PART 2 - MATERIALS

2.01 PLUMBING MATERIALS

A. Potable Piping:

1. Plumbing for potable systems shall be lead-free per Public Law 99-339, Safe [Drinking Water Act](#).
2. Lead-free is defined as no more than 0.2 percent lead in solder and solder flux, and no more than 8 percent lead in pipe and fittings.

B. Domestic Hot and Cold Water, Non-Potable Water, and Pressure Drain Piping:

1. Above Grade: Piping shall be Type L hard drawn copper tubing, ASTM B88, with wrought copper solder type fittings conforming to ANSI B16.22, or cast copper alloy solder joint fittings conforming to ANSI B16.18, or cast copper alloy flanged fittings Class 150 conforming to ANSI B16.24. Screwed joints in piping are restricted to pipe sizes 2" and smaller.

Exception: Modifications to existing steel systems may use schedule 40, galvanized steel pipe, ASTM A53, Grade A or B, with 150 pound galvanized malleable iron screwed fittings conforming to ANSI B16.3.

C. Soil, Waste, Drain, and Vent Piping: Cast iron soil pipe, fittings and connections shall comply with CISPI guidelines.

1. Below Grade: Piping shall be service weight hub and spigot (with gasket) coated cast iron and shall conform to ASTM A74 or schedule 40 PVC.
2. Above Grade: Piping shall be hubless cast iron pipe and fittings conforming to CISPI 301.

D. Roof Drain Leaders:

1. Below Grade: Leaders shall be service weight hub and spigot coated cast iron and shall conform to ASTM A74 or schedule 40 PVC.
2. Above Grade: Hubless cast iron pipe and fittings conforming to CISPI 301.

E. Equipment Drains And Indirect Waste: DWV copper pipe with DWV wrought copper fittings in compliance with ANSI B16.29.

2.02 PLUMBING FIXTURES:

- A. Provide plumbing fixtures complete with trim. All fixtures, trimmings and stops shall be Grade "A" and shall be of one manufacturer. Plumbing fixtures and trim shall be as scheduled on the plans.
- B. Plumbing fixtures for use by handicapped persons shall be in accordance with ANSI 117.1. Plumbing fixtures shall be low water consumption type: 1.28 gal/flush for water closets, and 0.5 gal./flush for urinals.

C. Manufacturer's:

1. Fixtures: American Standard, Toto, or Kohler.
2. Fittings: American Standard, Chicago Faucet, Kohler, T&S Brass, Speakman, Symmons or Stern Williams.
3. Flush valves: Sloan Royal or Delaney.
4. Seats: Bemis, Beneke, Church or Olsenite.
5. Drinking Fountains: Elkay, Halsey Taylor, or Oasis.
6. Stainless Steel Fixtures: Elkay, Just or Advance Tabco.
7. Molded Stone, Fiberglass & Plastic Enclosures: Aquaglass, Stern Williams or Advance Tabco.

2.03 VALVES

A. Ball:

1. 2 Inches and Smaller: bronze body, blow-out proof captive stem, double Teflon seats, full ported, stainless steel or chrome plated brass ball, 2-piece, threaded or soldered ends. Nibco T-585-70 or S-585-70. Or a 3-piece bronze body, full port, stainless steel trim, with a blowout-proof stem. Nibco T or S-595-Y or equivalent.

2.04 FIBERGLASS PIPE INSULATION:

- A. Insulation: one piece fibrous glass sectional pipe insulation with factory applied glass reinforced aluminum foil and white kraft paper flame retardant vapor barrier jacket, with self-sealing longitudinal jacket laps and butt strips; average thermal conductivity not to exceed 0.23 BTU-in./ft.² - °F. - hour at a mean temperature of 75°F. Insulation thickness shall be 1".

B. Insulation shall be:

Johns-Manville	Micro-Lok AP-T
Owens Corning	Fiberglass 25 ASJ/SSL

C. Insulating cement shall be:

Johns-Manville	No. 301
48 Insulations	Quik-Set
Rockwood Mfg. Co.	Delta-Maid One Shot

D. Vapor barrier coating shall be:

Benjamin Foster	Tite Fit 30-35
Vimasco	740
Insul-Cooustic	F.R.V.B. IC-501
Childers Cil-Perm	CP-30

E. Breather coating shall be:

Comment [COMMENT1]: 1" thickness only for domestic H/CW. See C:\wp\MECH>SP\MORE\15180 for thickness table for CHW/HW

Benjamin	Sealfas 30-36
Insul-Coustic	Permsure IC-102
Vimasco	713
Childers Chil-Seal	CP-50

F. Equal by Knauf.

PART 3 EXECUTION

3.01 GENERAL:

- A. Make connections to all fixtures, traps and similar items. Place into operation all equipment.
- B. Refer to architectural drawings for the exact location of fixtures and drains. Determine roughing dimensions from the manufacturer of the equipment furnished on the job.

3.02 PLUMBING FIXTURES:

- A. Grout between plumbing fixtures and walls and/or floors.
- B. For connection of floor-outlet water closets, brass floor flanges shall be used. The joints between closet trap and flange shall be made tight with gaskets.
- C. Connection of fixture traps from lavatories, drinking fountains, service sinks, etc. to cast iron shall be made with D.W.V. type copper.
- D. Seal, using sealant meeting requirements of Federal Specification TT-S-230, joint between urinals and wall and at water closet and floor.

3.03 CLEANOUTS:

- A. Provide cleanouts where required by the applicable plumbing code.
- B. Cleanouts shall be the same size as pipe line in line sizes 4 inches and smaller. Pipe lines larger than 4 inches shall have 4 inch cleanouts.
- C. Cleanouts installed outside buildings shall be same as in floors and shall be flush with grade and have minimum 6 inch thick, 12 inch by 12 inch concrete pad poured around Cover. Cover shall be flush with top of concrete.

3.04 SOIL, WASTE, AND VENT PIPING INSTALLATION

- B. Install Soil, Waste, and Vent Piping in accordance with the International Plumbing Code (~~IBC~~IPC).
- C. All excavation and backfill shall be in accordance with 02200, "Earthwork".

3.05 APPLICATION OF PREFORMED FIBERGLASS PIPE INSULATION

- A. Apply insulation to straight pipes and tubes as follows: use preformed pipe insulation when able. Use pipe and tank insulation for larger diameter piping where preformed insulation is not available. To

meet required thickness, apply multiple layers of insulation with longitudinal and end seams staggered.

1. Keep SSL adhesive and contact surfaces clean and free of dirt and moisture. Seal immediately once adhesive is exposed. Seal circumferential joints with a minimum 3 inch wide tape and secure with two outward clinching staples at the overlap. Rub the longitudinal joints firmly with a squeegee and secure with 2 outward clinching staples evenly spaced in each 3 foot section of insulation.
 2. Where vapor retarders are indicated; Seal staples and any penetrations in the insulation with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet to form a vapor retarder between pipe insulation segments.
 3. Taper the ends of insulation at terminations. Seal all raw edges of insulation with mastic.
- B. Apply insulation to fittings and elbows and mechanical grooved couplings as follows:
1. Apply mitered sections of pipe insulation, or glass-fiber blanket insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
 2. Cover fittings with standard PVC fitting covers. Secure the fitting covers by wrapping the ends with minimum 1-1/2" wide PVC tape. Overlap a minimum of 2" and do not stretch the last 2" of tape. Secure the throat with a stainless steel tack.
 3. On systems requiring a vapor barrier, seal the throat with vapor barrier mastic (the PVC fitting cover is to act as the vapor barrier).
- C. Apply insulation to valves and specialties as follows:
1. Apply premolded pipe insulation sections of the same material as straight segments of pipe insulation, sized and cut to fit around the valve body, over the flanges, and around the bonnet. Fill all voids and seal all raw edges in insulation with vapor retarder mastic. Caulk around valve stem cutout.
 2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to strainer basket without disturbing insulation.
 3. Apply insulation to flanges as specified for flange insulation application.

END OF SECTION

SECTION 230100

MECHANICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 INTERPRETATION OF SPECIFICATIONS:

- A. General provisions and requirements apply throughout. Cross references or general provisions may be repeated for convenience or emphasis only.
- B. Interpret the following as indicated:
 - 1. "or equal": "in accordance with the General Conditions", or "an equivalent with respect to style and function."
 - 2. "approved": "approved or accepted by Governing Officials or the authorities having jurisdiction".
 - 3. "provide": "furnish and install, connect, and test, and contract for the performance of same."
 - 4. "wiring": "required conductors or cable and raceway system, including fittings, boxes, connectors, supports, hardware, labeling, and miscellaneous related accessories."
 - 5. "work": "materials completely provided," which shall include all activities and services necessary to meet contract requirements, including inspection and replacement as specified of any defective element."
 - 6. "materials": "equipment and/or materials."
 - 7. "(": "shall be/have" Specifications following a colon are criteria which apply to the term preceding the colon.

1.02 INSTRUCTIONS TO BIDDERS:

- A. Bidders are advised to visit the site and examine the existing conditions before submitting bids, as no allowance will be made for lack of knowledge of existing conditions where such conditions might reasonably be determined by observation.

1.03 SUBSTITUTIONS:

- A. Utilize only those materials specifically listed by the Contract Documents. Substitutions of alternative types of major materials will not be acceptable unless a written "prior" acceptance is obtained at least seven (7) working days before the Date for Submittal of Bids. Requests for prior acceptance of alternative materials must conform to the procedures for submitting shop drawings and product data.
- B. The design and layout shown on the plans are based on the manufacturer indicated on the equipment schedule. If equipment other than that used as the basis of design is submitted for use on this project, it shall be the responsibility of the Contractor to submit a revised drawing of the layout, showing the location, clearances for access and service. Changes to architectural, structural, electrical, mechanical,

ductwork, or plumbing systems shall be the responsibility of the contractor, including costs for redesign of these systems. Submittals shall clearly indicate any required changes to the building systems affected by substitution of equipment.

1.04 GENERAL SCOPE OF WORK:

- A. The Contract Documents establish the basic systems designs and the detail design of the work, or establish systems or materials performance criteria and minimum design requirements. In either case, certain aspects of the work or of the detail design are not established completely. Establish said work and details in accordance with industry norms and practice to suit the needs of the job. The work shall provide for complete systems and services unless otherwise specified herein.
- B. The work covered by this specification shall include furnishing supervision, labor, supplies, materials, equipment, tools, services, taxes and dollar costs required to construct and install the complete mechanical systems as specified herein and as shown by the plans and other relevant documents. Without limiting the generality thereof, the major items of the work are:
 - 1. Utility connections and metering, including temporary connections.
 - 2. Heating, Ventilation, and Air Conditioning system.
 - 3. Specialty systems as specified or shown by plans.
 - 4. Special tools for maintenance or inspection of materials.
 - 5. Necessary services and support work, including scaffolding, and hoisting.
 - 6. Permits, inspection fees, approvals, licenses, registrations, certificates, taxes, and specified or miscellaneous dollar costs.
 - 7. Shop Drawings and Product Data Submittals as specified.
 - 8. Inspections, tests, and systems and equipment demonstrations.
 - 9. Specified or necessary documentation and notifications.
 - 10. Materials transportation, delivery, handling, storage, protection, guarding and inspecting.
 - 11. Instruction of Owner's Operating and Maintenance Personnel.
 - 12. Temporary utility and site distribution system(s).
 - 13. Demonstration of completion of the work.
 - 14. Replacement of Defective Work.

1.05 CODES AND STANDARDS:

- A. The mechanical installation, equipment, materials and workmanship shall as a minimum be in accordance with the requirements and recommendations of the applicable local codes and the following:
 - 1. Heating, Ventilation and Air Conditioning:

NFPA 90A and NFPA 96, 1991 edition.

2. Applicable federal, state, and local laws, codes, ordinances, and rulings of Governing Officials having jurisdiction.
 3. Utility and service company regulations and requirements.
- B. Codes and standards cited establish only the minimum requirements for the work. Where requirements of the Contract Documents exceed requirements of the Codes and Standards, provide the work in accordance with the express requirements of the Contract Documents. Do not reduce the quality of the design or eliminate future capacity or options without acceptance by the Engineer, even if proposed changes meet minimum Code requirements.
- C. The latest editions of the specifications, standards, and listings of the following organization are made a part of this specification. Mechanical work, unless otherwise indicated, shall comply with their requirements and recommendations wherever applicable:
1. Underwriter's Laboratories, Inc. (UL)
 2. National Fire Protection Association (NFPA)
 3. American National Standards Institute (ANSI)
 4. American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE)
 5. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- D. Material shall be installed as required for the Seismic Rating of the area of the project. Submit installation details.

1.06 COMPLIANCE OF WORK WITH CODES AND ORDINANCES:

- A. Work shall comply with the requirements of local ordinances and Codes as modified and amended by Governing Officials having jurisdiction.
- B. Notify the Architect in writing of any instance where any requirement of the Contract Documents is in conflict with any Code or ordinance, so that any required changes may be made in a timely manner and without the need for remedial work. Do not perform work contrary to Codes, ordinances, regulations, or rulings of Governing Officials.

1.07 RELATED WORK IN OTHER DIVISIONS:

- A. The following work is generally specified by other Divisions of specifications, except for specific applications as called for by Division 23 specifications or plans:
 1. Installation of building access panels and plaster frames.
 2. Painting.

1.08 PERMITS AND COSTS:

- A. Obtain and pay for permits, assessments, taxes, fees, licenses, etc. necessary for the installation of the work. Deliver to the Owner all such certificates of inspection or occupancy issued by Governing

Officials.

1.09 SHOP DRAWINGS AND PRODUCT DATA:

- A. Submit shop drawings and product data for review for major systems and materials, including:
1. Cleanouts
 2. Plumbing Fixtures and Accessories
 3. Plumbing Specialties
 4. Fire Protection System Layout (at same scale as the mechanical floor plans)
 5. Sprinkler Heads
 6. Fire Protection System Appurtenances (compressors, valves, etc.)
 7. Air Distribution Products and Accessories
 8. Dampers
 9. Duct Lining
 10. Ductwork and accessories
 11. Flexible Ductwork
 12. Insulation (duct and pipe)
 13. Sheet Metal Work
- B. Prepare shop drawings giving locations for major equipment, ductwork, and piping, based on equipment to be installed (as ordered), and submit these for review. Shop drawings shall show the location and weight of each item of roof mounted equipment, roof openings, pads, sleeves, anchor bolts, etc., and shall be of a scale not less than that of the contract plans. The shop drawings shall give all clearances recommended by the manufacturer for the service or removal of equipment/materials.
- C. Sheet metal shop drawings shall be submitted, based on field measurements of actual conditions and the equipment submitted and approved for this project. Sheet metal shop drawings shall clearly indicate all changes required to accommodate actual field conditions such as interference with structural or other building elements and systems.
- D. Submittals shall include catalog cuts, bulletins, plates, drawings, diagrams, schedules, and any other information as necessary to indicate the relative characteristics, ratings, and capacities of the respective items of equipment.
- E. Submittals shall be checked for accuracy and coordinated between the involved trades before submission for review and acceptance by the Engineer. Notify the Architect in writing where shop drawings indicate elevations of piping or ducts which would place pipe or duct below lighting fixtures or ceilings, or that would require the lowering of lighting fixtures or ceilings. The Architect shall

likewise be notified of any other similar type conflict between materials as installed, or shown by plans or Shop Drawings.

- F. Each shop drawing, product data sheet, catalog cut, etc. submitted shall bear on its face an acceptance date and signature of the Contractor, indicating that the submission has been checked and accepted for installation by the Contractor.
- G. Submit complete drawings and product data for any modified materials or proposed substitution of equivalent materials. When such materials are required or proposed, provide technical information on operating conditions, ratings, and capacity of the materials, including any and all related changes necessary or desirable to the basic design of any involved system in the facility. Where standard material (equipment) is modified to suit the conditions required, provide certification from the manufacturer of the required operating conditions, ratings, and capacities of the materials. Any submittal of alternate materials shall be in accordance with the General Conditions.
- H. Submittals for review shall be fully in accordance with and consistent with the General Conditions, and with the requirements of the technical specifications and plans. Any technical exceptions shall be clearly and fully stated in one place.
- I. The Engineer's review of shop drawings and product data shall not change the requirements of the contract documents, nor shall this review relieve the Contractor of full responsibility for any and all errors or omissions in said documentation.
- J. Coordinate the structural, architectural and systems changes required for the mechanical equipment actually used on the project.
- K. Submit a complete plan supports and restraints for the Seismic requirements of this zone.

1.10 DOCUMENTATION, MANUALS AND RECORD PLANS:

- A. Prepare manuals containing certificates or letters of warranty or guarantee, operating and maintenance instructions and recommendations, test results, and other data specified herein, and deliver the manuals to the Owner's Representative upon completion of the work. These manuals shall include information on major materials (such as major equipment) and on special systems or materials. Any special tools required for service or repair shall be listed.
- B. Manuals shall be ring binders with the name of the manual, project, Architect, Engineer and Contractor placed on the cover of each manual. Each manual shall contain a table of contents listing the items contained therein by number and name. Each item shall be properly indexed with a standard metal reinforced cover page tab, with item number and name printed on tab per se.
- C. Installation, Operation, and Maintenance (IOM) Manuals for major materials (equipment) shall be provided in separate manuals, or sets of manuals, for each major system or item of material. These IOM Manuals shall contain detailed instructions for operation and maintenance of the major equipment, devices and materials requiring periodic inspection or service. IOM Manuals shall contain the following items of information:
 - 1. Manufacturer's maintenance and operation recommendations.
 - 2. Final (corrected) shop drawings and product data information.
- D. Make written certification to the Architect that tests, checks, verifications, and settings have been satisfactorily completed. Where any item cannot be certified as correct, make a written report of the

relevant facts and test data.

- E. Have bonds, guarantees, receipts, affidavits, etc., called for in the various specification articles prepared and signed in advance of final demonstration of completion and acceptance of the work. Deliver to the Architect at or before the time of inspection with a letter of transmittal, listing each item included.
- F. On a set of contract documents, maintain an accurate record of all deviations made during the progress of the work from the contract documents (plans and specifications). Also, maintain an accurate as-built record of the dimensional locations of outside underground materials such as meters, valves, and incoming utility lines, piping, or conduits. The marked-up (record) documents shall be available on the site for inspection during normal working hours.

1.11 SCHEDULING AND CONDUCT OF THE WORK:

- A. Work shall be performed on schedule and in a manner as described by the Special Conditions of the Specifications and by Division 23 specifications. Plan, coordinate, and execute the work to meet building schedules and so as not to produce interference between the work of the various trades, or with any special job site construction.
- D. Work shall be performed within the access, security, proprietary, and housekeeping conditions specified.

1.12 TRANSPORTATION AND DELIVERY:

- A. Provide and pay for the transportation, storage and handling of materials. Materials shall be delivered to the job site in ample quantities to provide for the uninterrupted progress of work as scheduled. Where necessary, provide expedited or special shipping or handling of materials to prevent interruption of the overall job progress.

1.14 GUARANTEES / WARRANTIES:

- A. Leave the entire mechanical system installed under this contract in proper working order. Replace any work or material which develops defects, except from ordinary wear and tear, within one (1) year from the date of beneficial acceptance by the Owner.
- B. The materials of the mechanical systems shall have the manufacturer's and/or supplier's guarantee or warranty put into effect by execution and filing of any and all related papers. For one (1) year from the date of acceptance, obtain service or repair under the terms of any said guarantee or warranty in the Owner's behalf.
- C. For a period of one (1) year from the date of acceptance, upon receipt of notification from the Architect of the failure of any material or workmanship, replace the failed material or workmanship, including removal and replacement, or repair.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Equipment and materials shall be new, of the best quality and grade of the relative quality established, of manufacturer's standard, established product line. Where applicable standards are established, shall conform to National Board of Fire Underwriter's requirements and bear the seal of approval of a recognized and approved testing agency, as accepted by the Engineer.
- B. Once a product line has been established, it shall be consistently maintained throughout the entire installation.
- C. Equipment and components that interact to form equipment assemblies and/or systems shall be of the same manufacturer to the greatest extent possible.

2.02 BUILDING ACCESS PANELS:

- A. Building access panels shall be of metal construction with hinged door and an inconspicuous frame. The size shall be as required to provide proper access for maintenance and service, with a minimum size of 18 X 18-inches.
- B. Access panels shall be Milcor "DW", or equal, for drywall locations and Milcor "K", or equal, elsewhere.
- C. Access panels shall be "B" label where installed in rated walls.

2.03 PAINT:

- A. Paint used for touching up factory painted apparatus shall be top quality and selected to match the factory finish.
- B. Cold galvanizing compound shall be Sherwin-Williams "Zinc-Clad Primer" or equal.
- C. Rust Preventative paint shall be "Rust-Oleum" or equal.

2.04 ELECTRICAL MATERIALS:

- A. Electrical materials shall meet the requirements of Division 26 specifications.

PART 3 - EXECUTION

3.01 GENERAL DESIGN AND WORK:

- A. Read and study relevant documents, including Codes. Become familiar with the site, the scope of work and services, type of general construction, and the civil, structural, architectural, interior design, mechanical, electrical and special system plans and specifications.
- B. Establish design and work details as necessary to provide for the complete installation of materials and the successful operation of systems. Notify the Engineer in writing and in a timely manner if responsibilities or directions are not clear, or if assistance is desired in determining the needs or requirements for any particular item.

3.02 INTERFERENCES AND COORDINATION:

- A. The plans showing mechanical work are generally diagrammatic in nature. The plans shall not be scaled for any dimension.
- B. Coordinate the work with that of different trades so that interferences between the mechanical work and other work will be avoided. Refer to building plans for guidance as to dimensions, finished grades, ceiling heights, door swings, room finishes, location of ducts, pipes, equipment, outlets and similar details that are required, and coordinate final installation with work as actually installed. Outlets and connections for equipment or devices to be installed by different trades shall be coordinated to assure that the outlets and connections are properly sized and located with respect to the equipment served and the surrounding areas.
- C. Offsets and fittings in lines, and adjustments to equipment and fixture locations, as accepted by the Owner's representative, shall be provided to accomplish the work in a satisfactory manner.
- D. If interference develops, the Owner's representative shall decide which item of equipment, ductwork, piping, conduit, etc. must be relocated, regardless of the sequence of installation of the affected items.

3.03 SPACE REQUIREMENTS:

- A. Materials shall fit into the space provided in the building or property and shall be installed at such time and in such manner as to avoid damage to the building structure or property, as required by the job progress.
- B. Materials requiring normal servicing or maintenance shall be made easily accessible, including associated connection devices, wiring and/or piping.
- C. Ductwork, piping, raceways, and supports must be kept as close as possible to walls, floor slabs, columns, etc., so as to take up a minimum amount of space. Offsets and fittings required to accomplish this shall be furnished and installed.
- D. Ductwork, piping or other such non-electrical materials shall not be located within 42-inches of switchboards, panelboards or motor control centers, including the space horizontally from the electrical equipment, and the space from floor to structural ceiling over electrical equipment.
- E. Ductwork, piping, raceways and cable for public or finished spaces are to be concealed unless otherwise specified or indicated.

3.04 WORKMANSHIP:

- A. Workmanship shall be of the highest quality and no substandard work will be accepted. Work shall be done by workmen skilled in the trade involved.

3.05 PROTECTION OF MATERIALS AND EQUIPMENT:

- A. Protect materials from the elements and other causes of damage during shipment, storage, and erection, until final acceptance by the Owner.
- B. During construction, cover the fronts of equipment to prevent marring or defacing.

- C. Open ends of ductwork, pipe, or conduit shall be closed with temporary closures or plugged when work is stopped, to prevent debris from entering.
- D. Air handling systems shall have filters installed before any operation of the system. Exhaust fans may be protected using temporary filters cut from roll media and fastened over air inlets.

3.06 INSTALLATION OF MATERIALS:

- A. Materials shall be installed in accordance with the manufacturer's published recommendations for installation, in accordance with any listing restrictions of a certifying laboratory or agency, and in accordance with the requirements of involved Government Agencies or local Governing Officials.
- B. Materials shall be set level, square and plumb, properly oriented, aligned and secured in the location indicated.
- C. Lock washers shall be installed under nuts which bear on metal.
- D. Surfaces to be painted shall be clean and free of dirt, dust, oil and rust.
- E. Where galvanizing is broken during fabrication or installation (including tack welding), recoat exposed areas with cold galvanizing compound.
- F. Exposed iron or steel materials such as ductwork, piping, conduits and supports (but not equipment, devices, and components), including those exterior to the building, where exposed to view without removing ceilings or access panels shall be painted with one coat of rust inhibiting paint. The type and color of paint shall be acceptable to the Architect.
- G. Materials and supports above ceilings, but visible through grilles or diffusers, etc., shall be painted flat black unless inappropriate due to listing restrictions or function.

3.07 BUILDING ACCESS PANELS:

- A. Building access panels shall be installed where required to provide access for service and maintenance for equipment, fans, heaters, ductwork, damper operators, valves, traps, instruments, etc., including associated connection devices, wiring and/or piping. In general, only one (1) access panel shall be provided for an item of equipment and associated connecting devices, wiring and/or piping. Where feasible one access panel may serve several items of equipment.
- B. Access panel location and size shall be coordinated with materials/ equipment served to allow for installation, operation, inspection and maintenance as necessary, including testing and recalibrating. Access panels for fire dampers and/or duct smoke detectors shall allow resetting of the dampers and/or detectors. Coordinate the requirements between all involved trades.
- C. Access panels are not required for materials above lay-in (push-up) ceiling systems.

3.08 SUPPORTING DEVICES AND MATERIALS:

- A. Necessary supports for properly mounting materials shall be provided. Supports shall provide adequate and rigid mounting for materials, unless otherwise indicated by plans or functionally required. Supports shall be fabricated and installed in a neat and workmanlike manner, and care shall be taken that at no time shall any portion of the building structure be overloaded or weakened in any manner.

- B. Unless otherwise indicated, select and size foundations, supports, and fasteners.

3.09 CUTTING AND PATCHING:

- A. Coordinate with the various trades sufficiently ahead of the construction of any floor, wall, ceiling, roof, or other element, and identify openings, foundations, pads, curbs, and inserts that will be required for the work. Do not cut any structural member without having received written permission from the Architect.

3.10 CLEANING:

- A. Clean equipment, fixtures, devices and other materials furnished or set in place. Plaster, paint, stickers, rust, stains, and other foreign matter or discoloration shall be removed. Surfaces shall be polished and free of paint, oil, grease, and other dirt and debris. Touch up or refinish materials which have been damaged or marred during the construction process.

3.11 LUBRICATION:

- A. After installation of equipment, motors and equipment components which were furnished or installed by the Contractor and require lubrication using oil, grease, or special type lubricant, shall be lubricated as recommended by the manufacturer.

3.12 MARKING AND LABELING:

- A. Provide marking and labeling for major items of equipment, controls, and materials.

3.13 CHECKS AND TESTS:

- A. Make tests as reasonably required by the Engineer to prove the integrity of the work, and leave the complete installation in first class condition and ready for operation.
- B. Individual systems shall be thoroughly tested and demonstrated to meet full functional requirements.
- C. See sections 23040, 23400 & 23900 for additional testing requirements.

3.14 DEMONSTRATION OF COMPLETION:

- A. The project shall be demonstrated to be completely installed and calibrated and suitable for acceptance by the Owner. Suitable acceptance inspections shall be performed to determine whether the Contractor has completed the work in a proper and workmanlike manner, that he has installed the work in accordance with the intent of the plans and specifications, that the installation is apparently safe for use by building occupants, including operating personnel, and that in the Architect and Engineer's opinion the work is satisfactory for the Owner to accept.

3.15 INSTRUCTIONS TO OPERATING PERSONNEL:

- A. Instruct Facility Operating Personnel in the safe and correct procedures for cleaning, checking, logging, lubricating, testing, trouble shooting and operating of equipment and systems. The instructions shall be conducted at the job site by qualified personnel of the Contractor, Supplier, or Manufacturer, and shall include reviewing the operation instructions and maintenance recommendations with qualified Facility Operating Personnel.

END OF SECTION

SECTION 230400

TEST, ADJUST AND BALANCE

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Perform testing, adjustment and start-up of mechanical systems as described herein.
- B. Testing and balancing shall be performed by an independent test and balance agency that specializes in and whose business is limited to testing and balancing of air conditioning systems. The Engineer, acting for the Owner, shall approve this agency, which shall be one fully certified by AABC or NEBB.
- C. Testing and balancing agency, as part of it's contract, shall act as authorized inspection agency, responsible to the Engineer and Owner, and shall, during the test and balance, list all items that are not installed correctly, require correction, or have not been installed in accordance with contract documents.
- D. Testing and balancing shall be performed in complete accordance with AABC National Standards, 1982, 4th Edition.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide all instruments, equipment, materials and recording devices necessary for tests and adjustments.

PART 3 - EXECUTION

3.01 GENERAL

- A. Perform initial test and balance immediately after equipment has been started up and before building is occupied.
- B. After initial test and balance has been completed, the test and balance agency shall re-balance the systems based on space temperatures, under actual occupied conditions, to provide CONSTANT even temperatures in each area. The control settings shall also be adjusted to achieve comfort in the spaces, and prevent one unit from "fighting" the other units.
- C. Installation shall not be considered complete until final reports by agency have been submitted and approved by the Consulting Engineer.

3.02 AIR BALANCE

- A. Test system with fan speed set to maximum conditions. Make pitot tube traverse of main supply, exhaust and return ducts; determine CFM at fans and adjust fans to design CFM.
- B. Test and record system static pressure, at fan suction and discharge.
- C. Test and record cooling apparatus entering and leaving air temperatures, dry bulb and wet bulb.

- D. Test, balance, adjust and tabulate the air quantities of all supply, return, exhaust and outside air ducts and air terminal devices within 10% of indicated values.
- E. Adjust flow patterns from air terminal units to minimize drafts as equipment permits.

3.03 CONTROL PERFORMANCE CHECK

- A. The results produced by the operation of automatic controls shall be checked by the testing agency; controls requiring adjustment shall be listed and reported to the Contractor. This does not reduce the responsibility of the Contractor for the checking and adjustment specified under the Temperature Control Section.

3.04 REPORTS:

- A. Reports shall be certified by the testing engineer that the methods used and the results obtained are as specified herein.
- B. The test and balance contractor shall, as part of its responsibility, submit written reports of all mechanical system deficiencies to the Project Manager for action.
- C. The final records of readings, calculations and adjustments shall be submitted to the Architect. The final report shall include a single line system schematic diagram indicating the location of testing points referenced in the report.

END OF SECTION

SECTION 231800

INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Provide insulation for ductwork furnished under this division.

1.02 QUALITY ASSURANCE:

- A. Products of the manufacturers listed under PRODUCTS will be acceptable for use for the specific functions noted. Adhesives, sealers, vapor barriers and coatings shall be compatible with the materials to which they are applied, and shall not corrode, soften or otherwise attack such material in either the wet or dry state.
- B. Material shall be applied subject to their temperature limits. Application of insulating materials or finishes shall be in accordance with manufacturer's published recommendations unless otherwise specified herein.
- C. Insulation shall be applied by experienced workers regularly employed for this type of work.

1.03 RATING:

- A. Insulation and accessories such as adhesives, mastics, cements, tape and jackets, unless specifically excepted, shall have a flame-spread rating of not more than 25 and a smoke developed rating of not more than 50. Materials which are field applied may be tested individually.
- B. Flame Spread and Smoke Developed Ratings shall be determined by Method of Test of Surface Burning Characteristics of Building Materials, NFPA No. 255, ASTM E-84, UL 723.
- C. Products or their shipping cartons shall bear a label indicating the flame and smoke rating do not exceed above requirements.
- D. Treatment of jackets or facings to impart flame and smoke safety shall be permanent. Water-soluble, fugitive, or corrosive treatments shall not be used to meet RATINGS criteria.
- E. Certify in writing prior to installation, that products to be used will meet RATING criteria.
- F. The perm rating for vapor barriers shall be not more than 0.05 perms and the rating for adhesives, coatings and mastics shall be not more than 0.25 perms.

PART 2 - PRODUCTS

2.03 FIBERGLASS BLANKET INSULATION FOR DUCTWORK:

- A. Systems: Concealed supply air ductwork.

- B. Blanket type insulation:
1. "K" Value, average thermal conductivity, not to exceed 0.27 BTU-in./ft.² - °F. - hour at a mean temperature of 75°F.
 2. Minimum density of .75 lb/cu. ft.
 3. 2" thick.
- C. Insulation shall be:
- | | |
|----------------|--|
| Johns-Manville | Microlite FSK faced wrap, 0.75 lb. density |
| Owens Corning | Fiberglass Faced Duct Wrap FRK 25, Series ED-100 |
| Certainteed | Ultralite Duct Wrap Type IV |
- D. Fire retardant adhesive for securing insulation to ductwork and for sealing 2" facing flange at circumferential joints:
- | | |
|-----------------------|-------------------|
| Benjamin Foster 85-20 | Childers CP-82 |
| Insul-Coustic IC-225 | Eplux Cadalar 400 |
| Vimasco 733 | |
- E. Three inch wide foil reinforced kraft tape:
- | | |
|------------|------------|
| Arno C-430 | Nashua FSK |
| Fason 0822 | |

2.04 FIBERGLASS LINER FOR DUCTWORK:

- A. Systems:
1. Supply ductwork exposed in the space.
 2. Supply ductwork for the first 10 ft. from the air handling unit, or through the second elbow, counting the one which turns the duct horizontally from the air handling unit.
 3. Return air ductwork.
- B. Duct liner: fibrous glass type with one side coated with a black fire retardant compound; average thermal conductivity not to exceed 0.27 BTU-in. per sq. ft. per degree F. per hour at a mean temperature of 75°F; minimum density of 1-1/2 lb/cu. ft.; 1-1/2" thick.
- C. Duct liner:
- | | |
|----------------|-------------------|
| Johns-Manville | Microlite |
| Owens-Corning | Aeroflex Type 150 |
| Certainteed | Ultralite # 150 |
- D. Fire retardant adhesives:
- | | |
|-----------------------|----------------------|
| Benjamin Foster 85-20 | Childers CP-82 |
| Insul-Coustic IC-225 | Epolux Cadoprene 400 |
| Vimasco 733 | |

PART 3 - EXECUTION

3.01 APPLICATION OF FIBERGLASS BLANKET DUCT INSULATION:

- A. Wrap insulation around ducts with circumferential joints butted and longitudinal joints overlapped a minimum of 2 inches. Adhere insulation to ducts with 4" strips at 8" on center of fire retardant adhesive; additionally, for ducts over 24 inches wide, impale insulation on the bottom of the ducts on metal pins, on maximum 18 inch centers, welded to the duct and secure with speed washers. On circumferential joints, seal the 2" flange on the insulation facing with fire retardant adhesive and tape with 3" foil reinforced kraft tape; tape terminations of insulation at fire dampers, flexible connections and ends of ducts to the duct with 3" wide foil reinforced kraft tape. Seal penetrations and punctures in insulation facing with foil reinforced kraft tape and fire retardant vapor barrier coating.
- B. Mark insulation in such a manner to allow easy inspection after installation.
- C. Apply insulation to standing seams and other projections in ductwork or casings so that at least 1/4" of insulation covers such projections.
- D. Where ductwork is lined, no external ductwork insulation is required.
- E. Where unlined duct and lined duct connect, the external insulation shall overlap lined section a minimum distance of 4 inches.

3.02 APPLICATION OF FIBERGLASS DUCT LINER:

- A. Cut duct liner to provide overlapped and compressed longitudinal corner joints. Install liner with black coated surface facing the air stream. Adhere duct liner to the ductwork interior with a 100% coverage of the sheet metal surfaces using a fire retardant adhesive; adhesive shall be applied by spraying. Coat all exposed leading edges and all transverse joints with fire retardant adhesive. In addition, secure liner using metal pins welded to the duct and speed washers. Spacing of metal pin shall be in accordance with SMACNA Manual for "Duct Liner Applications Standard," Second Edition, 1975.
- B. Protect exposed edges of the lining by 24 gauge galvanized "Z" shapes installed at the edge of the lining, extending over flat side of lining 1/2 from edge.

END OF SECTION

SECTION 238000

DUCTWORK AND AIR DISTRIBUTION

PART 1 - GENERAL

1.01 DUCTWORK:

- A. SMACNA Standards referred to hereinafter shall mean standards published by the Sheet Metal and Air Conditioning Contractor's National Association, Inc.
- B. Except where indicated otherwise, duct construction and installation shall conform to the recommendations of the SMACNA manual for High Pressure Duct Construction Standards. Ductwork shall be constructed and sealed as required for a 6" static pressure rating, Seal Class "A", in the previously referenced standard.
- C. Ductwork as indicated is diagrammatic only and does not show all necessary offsets, hangers, and accessories. All such items required for a completed system shall be furnished by the Contractor.
- D. Sizes shown for lined ductwork are clear inside dimensions and sheetmetal dimensions shall be increased to allow for thickness of lining.

1.02 AIR DISTRIBUTION:

- A. Select products to provide full coverage of areas served without objectionable noise or draft. Products shall be selected for noise levels not in excess of NC-30. Air distribution products shall be tested and rated in an Air Diffusion Council Certified Laboratory. Unless indicated otherwise, all air distribution products shall be furnished by one manufacturer, who shall catalog a full line of both steel and aluminum air distribution devices.

PART 2 - PRODUCTS

2.01 DUCTWORK:

- A. Supply, outside air, return, transfer and restroom exhaust ductwork shall be constructed of galvanized steel sheets of lock form quality per ASTM A653 with a G90 zinc coating (0.90 oz/ft² both sides), unless otherwise shown on the contract documents. Sheets shall be free of pits, blisters, slivers, and ungalvanized spots.
- B. Angles, rivets, nuts and bolts used in the construction, bracing, or hanging of ducts shall be of the same material as the duct in which installed.
- C. Low pressure ductwork, ductwork that is installed downstream of a low pressure air moving device or terminal unit, shall be fabricated to meet minimum 2" w.g. internal pressure.
- D. Medium pressure ductwork, ductwork that is installed between an air moving device and terminal units, shall be fabricated to meet minimum 4" w.g. internal pressure.
- E. Longitudinal seams at corners of rectangular ducts shall be Pittsburgh type or button punch snap lock with locks preferably on the tops and bottoms of ducts, not on the sides.

- F. All duct panels for rectangular ducts over eighteen (18) inches in either height or width shall be cross-broken, except as noted and/or specified. Duct panels in which grilles, diffusers or access doors are to be installed shall not be cross-broken unless the distance from the edge of the grille, diffuser or access door to the edge of the panel exceeds eighteen (18) inches, in which case this portion of the panel shall be cross-broken. The area to which the grille, diffuser or access door is attached shall be left flat. Ducts which are specified to be finished with rigid insulation shall not be cross-broken.
- G. Low pressure elbows shall be full radius type or square type with turning vanes. Where elbows have a different size inlet and outlet, turning vanes shall be single thickness type with extensions on the leaving side. Turning vanes shall be installed with vanes parallel to the elbow.
- H. Medium pressure elbows shall be full radius type, no exceptions. Turning vanes are strictly prohibited in medium pressure ductwork.
- I. Tee connections on branch ducts shall be the radius tap-in type. Branch take-offs from trunk ducts shall be similar to SMACNA Plate 2-5, except that adjustable splitter damper shall be provided at these points or SMACNA Plate 26, Fig. B with adjustable vanes.

2.02 HANGERS & SUPPORTS

- A. Hangers and supports for ductwork shall be in accordance with SMACNA standards.
- B. Hangers and supports for hood exhaust system shall consist of either angles under the duct or clips welded to the duct supported by rods secured to the structure.

2.03 FLEXIBLE CONNECTIONS:

- A. Flexible connections in rectangular ducts shall be weatherproof minimum 20 oz. Ventglas as manufactured by Vent Fabrics, Inc., Eigin Mfg., or Duro Dyne Corp. Flexible connections shall be not less than six (6) inches long and shall have suitable metal collar frame at each end with allowance of at least two (2) inch slack in fabric to eliminate vibration transmission. Flexible connections exposed to the weather shall be constructed of at least two layers of fabric, and shall be watertight. Provide flexible connections to ductwork at the air handling unit.

2.04 FLEXIBLE DUCT:

- A. Flexible duct shall be insulated, with a flame spread rating not over 25 and a developed smoke rating not over 50. Inner sleeves shall be fiberglass or tedlar covered spring steel. Insulation shall be no less than 1" thick fiberglass with a vapor barrier jacket.
- B. Flexible duct shall be rated for 6.0 inch static pressure.
- C. Flexible duct shall be connected with circumferential compression clamps consisting of either screw-driven, slotted stainless steel bands or ratcheted nylon straps.
- D. Flexible duct shall be Clevaflex, Genflex, Flexmaster, Thermaflex, or Wiremold.

2.05 SPIN-IN FITTINGS:

- A. Spin-in fittings shall consist of a round galvanized sheet metal collar with a groove designed to allow the fitting to screw into a mating hold. Spin-ins shall have an extractor and manual balancing damper with a locking quadrant operator. Spin-in fittings on the inlet side of variable volume boxes shall be bell mouth type, without dampers or extractors.

- B. Spin-in fittings shall be mounted with the extractor facing into the airstream. After insulation, a galvanized sheet metal strap shall be screwed to the duct and the fitting to ensure permanent, proper positioning of the fitting.

2.06 AIR DISTRIBUTION DEVICES:

- A. Air distribution devices shall be as scheduled on the drawings.
- B. Air distribution devices shall be: Anemostat, Carnes, Krueger, Metalaire, Price, Titus, Tuttle & Bailey.
- C. Diffusers shall be complete with pattern adjustment device, straightening vanes and volume control dampers. Diffuser backplate shall transition smoothly from neck size to full face size. Straightening vanes and dampers are not required where diffusers are attached to round flexible ductwork. Internal parts of diffusers shall be secured so that they can be removed and assembled without special tools.
- D. Grilles and registers with borders shall have felt or rubber gaskets cemented to the back face and holding screws not over 18 inches on centers around the perimeter. Grilles passing air through partitions shall be as described for wall return grilles, 1 for each side partition.
- E. Frame types of diffusers and ceiling return grilles shall match ceiling type(s) as indicated on architectural drawings. Diffusers and ceiling return grilles in lay-in ceilings shall be sized to lay in a nominal 24 inch x 24 inch grid opening.
- F. Registers shall be same as grilles with opposed blade damper.
- G. Finish shall be off white baked enamel unless otherwise indicated. Aluminum construction, linear diffusers and bar grilles: exposed surfaces to be clear anodized aluminum, interiors to be flat black.

PART 3 - EXECUTION

3.01 SHEETMETAL WORK - GENERAL

- A. Access panels shall be installed on entering side of all turning vanes, fire dampers, control dampers and other locations where cleaning, oiling, inspection or maintenance are required. Access doors shall be located in bottom or side of ducts for ease of access.
- B. Provide supplemental stiffening on ducts and apparatus casings to prevent drumming and to provide a structurally sound assembly.
- C. Interior of ducts shall be smooth with joints caulked or sealed with duct sealer. The entire air system shall be rigid, free from rattles and air noises.
- D. Ductwork connections to unit shall be arranged to avoid restricting access to panels which must be removed for servicing or cleaning of unit.
- E. Branch takeoffs to flexible ducts shall be made using spin in fittings. Branch take-offs shall not be located in the following locations: within 5 ft. downstream of an elbow, within 3 ft. of another take-off.

3.02 HANGERS AND SUPPORTS

- A. Duct hangers and support shall be in accordance with Section V (pages 5-1 through and including page 5-13) HANGERS AND SUPPORTS of the referenced SMACNA Standard, except:
 - 1. Hangers shall be spaced not over 8'-0" on centers.
 - 2. For rectangular ducts: with longest dimensions up through 60" hangers shall be the galvanized steel strap type; with longest dimension 61" and larger, hangers shall be trapeze type constructed of galvanized steel angles with round hanger rods. Sizes for strap hangers and trapeze angles and rods shall be based on duct size as scheduled in the SMACNA Standard, Table 5-1 (page 5-8) for strap hangers and Table 5-3 (pages 5-10) for trapeze hangers.
- B. Hangers for ducts suspended directly from the structure shall be screwed or "pop" riveted to the bottom and sides of the duct and secured to the structure by inserts, expansion shield bolts, beam clamps, welding, or bolting. Drive anchors shall not be installed in any location which will weaken the existing building. Install supplementary steel as required to bridge between joists and all supports shall be at joist panel points.

3.03 FLEXIBLE DUCTWORK

- A. Install flexible ductwork in a fully extended condition, free of sags and kinks using the minimum length required to make connection. Maximum length of flexible duct shall be eight feet.
- B. Support on a maximum of 4' centers with bands of 1" minimum width or wire through grommets furnished in seam of jacket.

3.04 GRILLES, REGISTERS, AND DIFFUSERS

- A. Secure sidewall grilles and registers to duct with galvanized sheetmetal screws.
- B. Wall return and relief grilles installed above eye level shall have blades positioned so that inside of duct or the adjacent space will not be visible through the grille.

END OF SECTION

SECTION 239000

AUTOMATIC CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Provide a complete system of electric or electronic temperature and safety controls for all mechanical equipment specified or shown on drawings.

1.02 GENERAL INSTRUCTIONS

- A. The Control systems as specified herein shall be provided in their entirety by the Contractor. The Contractor shall base his Bid on the system as specified, the sequence of operations, information on existing conditions gained from a site survey, and the points list.

1.03 QUALITY ASSURANCE:

- A. Controls shall be of the same manufacturer currently installed within the building.
- B. Controls shall be installed by trained mechanics employed by a building approved controls contractor.

1.04 JOB CONDITIONS:

- A. Coordinate work in occupied areas with the Owner and General Contractor to minimize inconvenience and provide adequate temperature control during construction period.
- B. Interface with building fire alarm and smoke detection system as provided by Division 16 shall be made under this section as specified hereinafter. Coordinate the work and devices required to meet the sequences specified.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Low voltage control wiring shall be not less than #18 plastic covered, color coded. Line voltage wiring shall not be smaller than #14 600 volt wire. Wire which is not "plenum rated" shall be run in conduit with outlet boxes and fittings as specified in Division 26. E.M.T. conduit may be used. All wiring shall be installed in strict accordance with the latest edition of NFPA-70, Article 725.

2.02 DEVICES:

- A. Thermostats & sensors shall match existing building standard.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Relocate existing PIU, thermostats and temperature sensors as shown on the drawings.

END OF SECTION

SECTION 260100

ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 INTERPRETATION OF SPECIFICATIONS:

- A. General provisions and requirements apply throughout. Cross references or general provisions may be repeated for convenience or emphasis only.
- A. Interpret the following as indicated:
 - A or equal@: A in accordance with the General Conditions@, or A an equivalent with respect to style and function@.
 - A approved@: A approved or accepted by Governing Officials or the authorities having jurisdiction@.
 - A provide@: A furnish and install, connect, and test, and contract for the performance of same.@
 - A wiring@: A required conductors or cable and raceway system, including fittings, boxes, connectors, supports, hardware, labeling, and miscellaneous related accessories@.
 - A work@: A materials completely provided,@ which shall include all activities and services necessary to meet contract requirements, including inspection and replacement as specified of any defective element@.
 - A materials@: A equipment and/or materials@.
 - A:@: A shall be/have@ Specifications following a colon are criteria which apply to the term preceding the colon.

1.02 SCOPE OF WORK:

- A. Install electrical work covered by the below specifications and approved drawings. Provide material, labor transportation, tools, supervision, etc., necessary to complete the total electrical job. Items not specifically mentioned herein which are obviously necessary to make a complete working installation shall be provided, including any necessary field engineering and/or detail drawings required. Submit drawings for approval as provided for A Shop Drawings@.
- B. The work shall consist of, but shall not be limited to, the following systems:
 - X Interior and exterior electrical system for lighting, power and secondary service entrance.
 - X Empty conduits for telephone and misc. systems.
 - X Power connections to equipment specified in specifications and approved drawings.
 - X Modify existing fire alarm system.

1.03 CODES AND FEES:

- A. Work shall be done in accordance with the requirements of the locally adopted edition of the National Electrical Code, NFPA #70 and local and state codes and regulations of utility company providing service.
- B. Obtain and pay for all permits and inspections required by the building and safety codes, and ordinances, and the rules and regulations of any legal body having jurisdiction.
- C. Electrical items covered by this specification shall be UL labeled and listed for the purpose.

1.04 DRAWINGS:

- A. The drawings indicate the general arrangement of electrical equipment. Review architectural drawings for door swings, cabinets, counters and other built-in equipment; conditions indicated on architectural plans shall govern for this work. Coordinate installation of electrical equipment with the structural and mechanical equipment and access thereto. Coordinate installation of recessed electrical equipment with concealed ductwork and piping, and wall thickness.
- B. Do not scale drawings. Dimensions for layout of equipment shall be obtained from architectural and/or mechanical unless specifically indicated on electrical drawings.
- C. Discrepancies shown on different drawings, between drawings and specifications or between documents and field conditions shall be promptly brought to the attention of the Architect.

1.05 SHOP DRAWINGS:

- A. Submit for review by the architect a complete schedule and data of materials and equipment to be incorporated in the work. Submittals shall be supported by descriptive materials, such as catalog sheets, product data sheets, diagrams, performance curves, and charts published by the manufacturer, to show conformance to specification and drawing requirements, model numbers alone will not be acceptable. Data submitted for review shall contain all information required to indicate compliance with equipment specified. Complete electrical characteristics shall be provided for all equipment. Submittals for lighting fixtures shall include photometric data. The architect reserves the right to require sample of any equipment to be submitted for approval.
- B. Each individual submittal item for materials and equipment shall be marked to show specification section and paragraph number which pertains to the item.
- C. Prior to submitting shop drawings, review the submittal for compliance with the contract documents and place a stamp or other confirmation thereon which states that the submittal complies with contract requirements. Submittals without such verification will be returned without review.
- D. Product and equipment submittals shall be transmitted with separators between types of equipment. Each submittal transmission shall contain a table of contents listing the items contained therein by number and name. Do not submit multiple copies.
- E. All submittals shall be made at one time. Submittals will not be reviewed until all of the submittals listed below have been received. Submittals shall be made for each of the following items:

Lighting Fixtures	
Circuit Breakers	Wiring Devices
Fire Alarm System Components	Photocell

- F. Prepare and submit scaled plan drawings and wall elevations of each electrical room showing all equipment within the room.

1.06 RECORD DRAWINGS:

- A. At the time of final inspection, provide combined pdf set of complete data on electrical equipment used in the project and as-built drawings reflecting all field changes. This data shall be in bound form and shall include the following items:
 - 1. Test results required by these specifications.
 - 2. Panelboard shop drawings and circuit directories reflecting all field changes.
 - 3. Data sheets indicating electrical characteristics of all devices and equipment.

1.07 EQUIPMENT CONNECTIONS:

- A. Connect equipment requiring electrical connections under this section of these specifications. Where electrical connections to equipment require specific locations, obtain such locations from shop drawings. Do not scale drawings for location of conduit stub-ups or boxes mounted in wall or floor to serve specific equipment, unless dimensioned on approved electrical drawings.
- B. Electrical circuits to equipment furnished under other sections of these specifications are based on design loads. If actual equipment furnished has loads other than design loads, electrical circuits and protective devices shall be revised to be compatible with equipment furnished at no additional cost to the owner.
- C. Equipment furnished under other divisions of these specifications to be connected under this section of the specifications shall consist of, but not be limited to, the following:
 - 1. Electrical equipment for heating, ventilating and air conditioning systems.
- D. Examine other sections of these specifications, where equipment requiring electrical service is specified. Become fully aware of the scope of the work under this section of these specifications requiring electrical service and connections to equipment specified elsewhere.

1.08 MECHANICAL SYSTEMS:

- A. Review plumbing and HVAC drawings and Division 23 of these specifications for mechanical equipment requiring electrical service. Provide service to and make connections to all such mechanical equipment requiring electrical service.
- B. Examine the nameplate data for equipment actually furnished on the project. If equipment has loads other than those indicated, control equipment and feeders shall be adjusted in size accordingly. Such adjustment shall be subject to the approval of the architect.

1.09 COORDINATION:

- A. Coordinate electrical activities with other trades so as to avoid delays, interferences, and any unnecessary work.

1.10 GUARANTEE:

- A. For guarantee of work under Division 26, refer to the general and special conditions.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Materials or equipment specified by manufacturer's name shall be used, unless approval of other manufacturers is listed in addendum to these specifications. Request for approval of substitute materials shall be submitted in writing to the architect at least ten working days prior to bid openings.
- B. Where substitution of materials alters space requirement indicated on the drawings, submit shop drawings indicating proposed layout of space, all equipment to be installed therein, and clearances between equipment.
- C. Material shall be new and shall conform to the applicable standard or standards where such have been established for the particular material in question. Publications and standards of the organization

listed below are applicable to materials specified herein.

1. American Society for Testing and Materials (ASTM)
 2. Underwriters= Lab (UL)
 3. National Electrical Manufacturer Association (NEMA)
 4. Insulated Cable Engineers Association (ICEA)
 5. Institute of Electrical and Electronic Engineers (IEEE)
 6. Edison Electric Institute (EEI)
 7. National Fire Protection Association (NFPA)
 8. American Wood Preservers Association (AWPA)
 9. American National Standards Institute (ANSI)
- D. Material of the same type shall be the product of one manufacturer.
- E. All cost incurred by the acceptance of substitutions shall be borne by the contractor. Proof for substitution shall be by the contractor.

PART 3 - EXECUTION

3.01 WORKMANSHIP:

- A. Work shall be neatly, orderly, and securely installed with conduits, panels, boxes, switches, etc., perpendicular and/or parallel with the principle structural members. Exposed raceways shall be offset where they enter surface mounted equipment. Wiring installed in panels and other enclosures shall be looped and laced and not wadded or bundled.

3.02 TESTS:

- A. At final inspection, a test will be made and the entire system shall be shown to be in proper working order as per these specifications and the approved drawings.
- B. Provide instruments, labor and materials for any essential intermediate and final testing.
- C. Equipment covers (i.e., panelboard trims, motor controls, device plates, and junction box covers) shall be removed, as directed, for inspection of internal wiring. All circuits throughout project shall be energized and shall be tested for operation and equipment connections in compliance with contract requirements. Accessible ceiling shall be removed, as directed, for inspection of equipment installed above ceilings.

3.03 IDENTIFICATION:

- A. Identify each device such as circuit breakers, panelboards, controllers, etc. with enamel or lacquer letters using machine cut stencils with 2" minimum letters, unless otherwise noted.
- B. Identify circuits contained within junction boxes on the cover of all junction boxes.

3.04 CLEANING AND PAINTING:

- A. Oil, dirt, grease, and other foreign materials shall be removed from all raceways, fittings, boxes, panelboard trims, and cabinets to provide a clean surface for painting. Scratched or marred surfaces of lighting fixtures, panelboard and cabinet trims, switchboard, or other equipment enclosures shall be touched up with paint furnished by the equipment manufacturers specifically for that purpose. Painting in general is specified under other sections of the specifications.
- B. Trim covers for flush-mounted panelboards, telephone cabinets, pull boxes, junction boxes and control

cabinets shall not be painted unless specifically required by the architect. Where such painting is required, trim covers shall be removed for painting. Under no conditions shall locks, latches or exposed trim clamps be painted.

- C. Unless specifically indicated to the contrary, all painting shall be done under the "Painting" section of these specifications.

END OF SECTION

SECTION 261000

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 GENERAL:

- A. Provide complete conduit system including boxes, fittings and supports. Leave empty conduits with fiber polyline pull cord. Conceal conduits except in unfinished spaces such as areas without ceilings. Type MC cable shall be used for wiring concealed in walls serving receptacles and switches. The MC wiring shall be extended from junction boxes mounted above the ceilings.

1.02 RACEWAYS:

- A. Install conduits per the below requirements:
 - 1. Intermediate Metal Conduit (IMC): ferrous galvanized conduit. Comply with Article #345 of the National Electrical Code.
 - 2. Rigid steel conduit: ferrous galvanized conduit. Comply with Article #346 of the National Electrical Code.
 - 3. Electrical Metallic Tubing (EMT): ferrous galvanized conduit. Comply with Article #348 of the National Electrical Code.
 - 4. Liquid tight flexible metal conduit. Comply with Article #351 of the National Electrical Code.
 - 5. Flexible metal conduit. Comply with Article #350 of the National Electrical Code.
 - 6. Rigid nonmetallic conduit: Polyvinyl Chloride Schedule 40 (PVC) conduit. Comply with Article #346 of the National Electrical Code.
- B. Coordinate raceways with the mechanical ductwork and plumbing work installed in the job,

1.03 OUTLETS:

- A. Location of Outlets: located diagrammatically on the drawings. Refer to the architectural and mechanical plans for the exact location of outlets. Locate outlets so that they will be symmetrical with architectural details. Locate power outlets to serve the equipment. The location of any outlet may be moved ten feet before it has been installed without additional expense to the owner.

PART 2 - PRODUCTS

2.01 CONDUCTORS:

- A. Conductors: Copper, 600 volt type THHN/THWN insulation except where noted on drawings. Conductors installed where fixtures are used as raceway shall be 90oC Type THHN or XHHN.
- B. Branch circuits: minimum #12 AWG solid copper except for motor leads, which shall be a minimum #12 AWG stranded copper, unless otherwise noted on drawings.
- C. Color code three phase system branch circuit and feeder conductors: No. 8 AWG and smaller as follows:
 - 1. 208Y/120 volt
 - a. Phase A: Black
 - a. Phase B: Red

- b. Phase C: Blue
- c. Neutral: White
- d. Ground: Green
- 2. 480Y/277 Volt
 - a. Phase A: Brown
 - b. Phase B: Orange
 - c. Phase C: Yellow
 - d. Neutral: Gray
 - e. Ground: Green
- D. MC Cable: Copper conductors with THHN insulation, steel armor, green grounding conductor, 600 volt.

2.02 PULLBOXES:

- A. Pull boxes: code gauge galvanized sheet steel, per Article 370 of the National Electrical Code, for the number, size and position of conduits entering the box, size of box and maximum number of conductors in a box.

2.03 OUTLET BOXES:

- A. Provide outlet boxes for each lighting fixture and for each device. Boxes shall not be smaller than specifically indicated herein and shall be larger if required by Article 370 of the National Electrical Code for the number and size of conductors installed. Where lighting fixtures are installed in continuous rows, only one outlet box shall be required unless otherwise noted on drawings.

2.04 RECEPTACLES AND WALL SWITCHES:

- A. Receptacles and wall switches: the type and size indicated on the drawings. Equal by Bryant, Eagle or P & S.
 - 1. Switches shall be 20 Amp 120/277 Volt specification grade. Number of poles: as indicated on drawings.
 - 2. Duplex outlets shall be 20 Amp 125 Volt AC 3 wire specification grade straight blade.
 - 3. Single outlets shall be 20 Amp 125 Volt AC 3 wire specifications grade straight blade.
- B. Device plates: one piece single or multi-gang type selected to match the specific device or combination of devices. Devices flush mounted in exposed masonry construction shall be jumbo type. Device plates for surface mounted devices shall be used with the type of outlet or outlet box in which the device is mounted. Provide devices installed in areas exposed to the weather with a weatherproof device plate. Device plates shall be metal.
- C. Finishes: See Architectural Plans for finish of Switch handles, Device faces, and Flush mounted cover plates.

PART 3 - EXECUTION

3.01 GENERAL

- A. Type MC cable shall be used for all branch circuit wiring in inaccessible areas. EMT steel conduit shall be used for all branch circuit homeruns and feeders.
- B. MC cable shall be run from homerun junction boxes to devices, switches, and light fixtures in inaccessible areas.
- C. Rigid steel conduit shall be used for raceways run exposed on exterior of building, in slabs on grade,

or in poured concrete walls or columns.

- D. Non-Metallic Conduit shall be used for raceways run underground and where non-metallic conduit or plastic conduit (PVC) is specified herein or shown on the drawings.
- E. All conduit and MC cable shall be run concealed unless otherwise directed or indicated on the drawings. Concealed conduit shall be run in walls and above ceilings.
- F. Conduit shall be run below grade or in the slab where indicated.
- G. Circuits above accessible ceilings shall be installed in EMT conduit.
- H. MC cable shall not be installed above accessible ceilings. MC cable shall not be installed exposed.

3.02 RACEWAYS

- A. Install exposed conduits parallel or at right angles to existing walls, ceilings, and structural members. Support exposed conduits at not more than ten foot intervals and within three feet of outlets, junction boxes, cabinets and fittings. Support individual runs of conduits by one hole conduit straps. Support groups of conduits on 2" x 2" fourteen gauge channel. Kindorf, Unistrut, or Powers, suspended from structure with 3/8" threaded steel rods with spring steel conduit supporters. Attach rods to structure with swivel type clamps. Support individual runs of exposed conduits attached to structural steel by beam clamps. Where conduits must pass through structural members obtain approval of architect with respect to location and size of hole prior to drilling.
- B. Support concealed branch circuit conduits at intervals not exceeding ten feet and within three feet of each outlet, junction box, cabinet or fitting. Attach individual branch circuit conduits to structural steel members with spring steel type conduit clips and to non-metallic structural members with one hole conduit straps. Where branch circuit conduits must be suspended below structure, support conduits by trapeze type support of exposed conduits. Attach concealed feeder conduits larger than one inch trade diameter above ceiling to structure on intervals not exceeding twelve feet with conduit beam clamps, one hole conduit straps or trapeze type support in accordance with conditions encountered. Do not attach conduits to channels of ceiling suspension system or suspension wires.
- C. Attach conduit support device to structure with wood screws on wood, toggle bolts on hollow masonry, lead shield on solid masonry and machine bolts, clamps, or spring steel clips on steel. Nails are not acceptable.
- D. Attach rigid conduit to sheet metal enclosures with two bonding type lock nuts and insulated bushing. EMT connectors and couplings shall be steel set screw type and manufactured by Thomas and Betts or Appleton. Connectors shall be of the insulated throat type. Terminate rigid conduit stub ups not attached to enclosure with steel insulated throat, grounding type bushing. Connectors and couplings shall be approved for the purpose.
- E. Provide expansion fittings in feeder conduits where conduits pass through building expansion joints. Conduits penetrating rated fire walls or rated fire floors shall be installed with devices to maintain the fire rating of the wall or floor penetrated. Use O.Z. Gedney "Fire-Seal" or approved equal. Contractor shall caulk holes on both sides of smoke walls where conduits penetrate.
- F. Support conduit on the roof by clamping to premanufactured polyethylene blocks with integral standard strut channel; Erico Pipe Pier.
- G. Protect conduits against dirt, plaster, and foreign debris with conduit plugs. Plugs shall remain in place until masonry work is complete.

- H. Seal conduits entering buildings from below grade with fiber and insulating electrical putty to prevent entrance of moisture.
- I. Use conduit seals where noted on drawings and per Article #300-5 and #300-7 of the National Electrical Code. Crouse-Hinds Type "EYS", Appleton Type "EYF" or O.Z. Gedney Type "EY" or "EYA".
- J. Flexible conduit shall comply with the above and below specifications.
 - 1. Use flexible conduit connection to vibrating equipment, electric duct heaters, unit heaters and rotating machinery, and for connection from junction box to corresponding recessed lighting fixture.
 - 2. Flexible liquidtight conduit connecting motors, duct heaters, unit heaters and other electrical equipment subject to vibration shall not exceed eighteen inches in length.
 - 3. Flexible metal conduit from outlet box to recessed lighting fixture shall not exceed six feet in length.
 - 4. Flexible conduit used for other than connections to lighting fixtures shall not be less than one-half inch trade size and in no case shall flexible conduit size be less than permitted by the National Electrical Code for the number and size of conductors to be installed therein. Three-eighths inch flexible conduit may be used for connection to lighting fixtures providing conduit fill requirements of National Electrical Code are not exceeded.
 - 5. Maintain ground continuity through flexible conduit with green equipment grounding conductor; do not use flexible conduit for ground continuity.
 - 6. When exposed to weather, when specifically indicated, or when installed in areas subject to moisture, flexible conduit shall be liquidtight type.
 - 7. Connectors for flexible conduit shall be the insulated throat type. When used with liquid type flexible conduit, connectors shall be of the screw-in ground cone type.

3.03 PULL OR JUNCTION BOXES:

- A. Provide pull boxes where specifically indicated and where required to facilitate the installation of conductors. Install pull boxes exposed only in unfinished spaces, unless otherwise specifically indicated, and install to be fully accessible.
- B. Where pull boxes are installed in finished spaces, boxes shall be flush mounted, with trim, hinged door and flush latch and lock to match panel trim for flush mounted electrical panel. Surface mounted boxes shall be Type "FD" with blank covers.
- C. Pull boxes required for horizontal feeders containing more than one feeder shall be provided with reinforced flange and removable 12 gauge 2" x 2" galvanized channel for support of conductors. Wood supports within pull boxes are not acceptable.
- D. Splices shall not be permitted in pull boxes except when specifically approved in writing by the architect or where specifically shown on the drawings. Where splices are permitted, splices shall be made with splicing sleeves attached to conductors with hydraulic crimping tool. Split bolt connectors are not acceptable for splices within pull boxes.
- E. Feeders within pull boxes shall be individually laced with nylon tie straps of the type with enlarged tab to permit identification of each feeder within pull box.
- F. Minimum pull or junction box size shall be 4 11/16" square by 2 1/8" deep.
- G. Mark on the coverplate of the junction box the circuit numbers of the circuits in that box. Marking may be made with permanent markers, in legible writing.

3.04 OUTLET BOXES:

- A. Outlet boxes for surface mounted and pendant mounted lighting fixtures shall be 4" octagon boxes, 1-1/2" deep.
- B. Outlet boxes for flush mounted lighting fixtures shall be 4" square boxes 2 1/8" deep, with blank cover installed adjacent to fixture. Box shall be accessible when fixture is removed. Connection to fixture shall be with flexible conduit and fixture wire.
- C. Outlet boxes for switches, receptacles and wall mounted junction boxes shall be 4" square boxes 2-1/2" deep with square edge cover. Where only one conduit enters box, 3 2" deep single gang switch box may be used. Outlet boxes shall be set to within 1/8" of finished wall.
- D. Outlet boxes for switches and receptacles in exposed wiring system shall be AFD@ boxes with matching device plate.
- E. Outlet boxes for individual switches, and receptacles flush mounted in exposed concrete block shall be single gang masonry boxes 3 2" deep, set to within 1/8" of finished block.
- F. Where special purpose device specified requires larger outlet box than specified herein, provide outlet box suitable for specific device. These outlet boxes shall be of the same type as specified herein for the specific installation required.
- G. Where low voltage device is to be installed in common outlet box with line voltage device, provide metal barrier within outlet box to establish two separate compartments.
- H. Outlet boxes used for support of surface mounted incandescent lighting fixtures shall be provided with fixture stud. Boxes shall be supported by light weight channel spanning between and attached to main ceiling support member. Attach channel to ceiling support members with galvanized tie wire or nylon tie straps.
- I. Outlet boxes shall not be used for support of fluorescent fixtures. Boxes shall be used only as junction boxes.
- J. Outlet boxes for use with communication, alarm and signal systems are specified with specific systems.
- K. Review architectural and interior drawings for areas where outlets occur within specific architectural or structural features and install outlets as shown on architectural drawings, or, if not shown, accurately center and align boxes within the architectural feature or detail.
- L. Unless otherwise indicated or specified, switches and receptacles shall be mounted with bottom of device, the distances indicated herein, above the finished floor except where finished walls are exposed concrete block, in which case height shall be adjusted to allow outlet box for device to be mounted at block joint. Review architectural drawings for any device requiring specific location. Mounting heights for devices shall be as follows (unless noted otherwise):
 - 1. Wall Switches: 48"
 - 2. Wall Receptacles: 18"
 - 3. Receptacles above counter tops: 4" above back splash with major axis horizontal
 - 4. Telephone and Computer Outlets: 18"
- M. Devices shall be mounted within outlet boxes to allow device plates to be in contact with wall on sides. Devices shall be accurately aligned with major axis of device parallel to adjacent predominate building feature.

- N. Wall switches shall be installed on the strike side of doors.

3.05 CONDUCTORS:

- A. Feeder and branch circuit conductors No. 6 AWG and larger shall be phase identified in each accessible enclosure by 1" wide plastic tape attached to conductors in a readily visible location. Tape colors shall match color requirements specified herein.
- B. Branch circuit conductors shall be connected as indicated on the drawings. Common neutrals and ground wires may be pulled in conduits where only opposite phase conductors are run. Conduits shall have a ground wire pulled and shall comply with Article 250 of the National Electrical Code.
- C. Conductors within enclosures, i.e., panels, terminal cabinets, control cabinets shall be grouped and laced with nylon tie straps. Conductors within pull boxes shall be grouped and identified with nylon tie straps with circuit identification tag.
- D. Splices in conductors shall be made only within junction boxes, wiring troughs and other enclosures as permitted by the National Electrical Code. Do not splice conductors in panelboards, safety switches, or motor control enclosures. Splices in conductors No. 10 AWG or smaller shall be made with Scotchlok insulated spring connectors, Ideal wing nuts, or Ideal steel crimp connectors with wrap-cap insulating caps. Splices in conductors No. 8 AWG and larger shall be made with split bolt connectors taped with No. 88 plastic electrical tape or Ideal Type GP or GT tap connectors and insulating cover unless splices are specifically indicated to be made with crimping sleeve applied to conductors with hydraulic operated crimping tool.
- E. Conductors used only for 120 Volt control wiring systems shall be minimum No. 14 AWG stranded type MTW 600 Volt insulation. Control conductors to be J.I.C. color coded. Where control conductors terminate on terminal strip, make termination with lug applied to conductor with crimping tool.
- F. Maintain phase rotation established at service equipment throughout entire project.
- G. Pull Wires: 500# minimum test continuous fiber polyline.

END OF SECTION

SECTION 264500

GROUNDING

PART 1 - GENERAL

1.01 GROUNDING:

- A. Grounding shall comply with Article 250 of the National Electrical Code, state and local codes, and the requirements of the utility company serving the site.

PART 2 - PRODUCTS:

2.01 MATERIALS:

- A. Grounding conductor: copper sized in accordance with Articles 250-94 and 250-95 of the National Electrical Code.

PART 3 - GROUNDING:

3.01 GROUNDING:

- A. Install a grounding conductor in power and lighting conduit installations. All circuit grounding conductors shall be sized per Article 250 of the National Electrical Code.

END OF SECTION

SECTION 265000

LIGHTING FIXTURES

PART 1 - GENERAL

1.01 GENERAL

- A. Select lighting fixtures from those fixtures included in the fixture schedule. Request for fixtures other than those listed in the fixtures schedule must be submitted in writing at least ten working days prior to opening of bids to the architect with copy to engineer.
- B. Request for fixture substitution must be accompanied by construction specifications, photometric test data including foot lambert reading, and complete dimensions. Data for exterior lighting luminaries must also contain isocandle curves and average lumen distribution data.
- C. Select fixtures from the fixture schedule not only by catalog number, but with consideration to mounting, number and types of lamps, and reference notes as contained in the fixture schedule and/or drawings.
- D. Lamps shall be provided for fixtures in accordance with fixture schedule and/or manufacturer=s recommendations.
- E. Plaster frames shall be provided for recessed fixtures as required when installed into gyp ceilings.
- F. Verify fixture numbers, before placing order, to assure that fixtures will be furnished with proper frames, fitting, and devices for installation in the ceiling system which is to be installed.

PART 2 - PRODUCTS

2.01 BALLASTS:

- A. Ballasts provided with fixtures shall be ETL-CBM approved, high power factor, with UL label. Ballasts for rapid start lamps shall be Premium Class P. Ballasts for T-8 lamps shall be electronic. Ballasts shall be for the voltage of the circuit to which connected. Ballasts shall be provided for fluorescent and high intensity discharge lamps. Ballasts shall not be less than or equal to 10% THD.
- B. Fluorescent fixtures exposed to outside temperatures shall be provided with 0 degree ballasts.

2.02 LAMPS

- A. Provide all lamps for lights on this project.
- B. Lamps shall be Philips, Sylvania or General Electric.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Install lighting fixtures in accordance with the manufacturer's recommendations, as herein specified, or as indicted on the drawings.
- B. Hang fluorescent fixtures suspended from ceiling joist by means of fixture chain and approved light support supplied by light manufacturer. Two supports are required for each four (4) foot fixture.

- C. Surface and wall mounted emergency lights are to be hung as per approved manufacturers methods for each light.
- D. Ceiling grids shall not be used for the sole support of recessed, lay-in type fixtures. Each lay-in type, recessed fixture shall be independently supported from the structure by two #10 hanger wires installed on diagonal corners of the fixture.
- E. Provide integral test switch as part of the fixture for lighting fixtures with emergency battery units. Do not use remote test switches.
- F. Provide U.L. "FR" Label for recessed lighting fixtures mounted in fire rated ceilings. Construct a fire rated enclosure around the fixture housings using fire rated acoustical ceiling tile.

END OF SECTION

SECTION 267200

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 SCOPE

- A. Provide all labor, material, tools, and equipment necessary for and incidental to the installation and testing of a fully supervised manual and automatic fire alarm system as described herein.
- B. The fire alarm system shall be the standard design of a single supplier. Components used shall be cross-listed for use with the system as selected by the Owner. Components shall be supplied by the same Manufacturer.
- C. Modify existing fire alarm as required to accept new devices.

1.02 FIRE MARSHALL APPROVAL:

- A. Prior to submitting shop drawings for the fire alarm system, the contractor shall meet with the local elements and interpretations of codes. Fire Marshall to review local requirements. Shop drawings shall reflect local requirements.

1.03 REFERENCES

- A. Fire alarm system and components shall conform to the following:
 - 1. NFPA 70
 - 2. NFPA 72
 - 3. NFPA 72E
 - 4. NFPA 72G
 - 5. NFPA 72H
 - 6. NFPA 241
 - 7. UL 164
 - 8. UL 268
- B. Equipment shall be listed as power limited by Underwriters Laboratories, Inc. or approved by Factory Mutual. The fire alarm system in its entirety shall be in compliance with applicable fire and electrical codes. Accessory components as required shall be catalogued by the Manufacturer and UL listed to operate with the Manufacturer's control panel and other fire alarm equipment. Equipment shall be approved prior to installation by the local fire inspection official and by the Local Authority Having Jurisdiction.

1.03 SUBMITTALS

- A. Submit the following Shop Drawings and Submittals listed below for review by the Architect. Submittals shall indicate conformance with the hereinbefore listed References, or provide certification of meeting those requirements.
 - 2.2
 - 1. Control Panel / Cabinet
 - 2. Peripheral Devices-Initiating
 - 3. Peripheral Devices-Signaling
 - 4. Peripheral Devices-Auxiliary
 - 5. Batteries with Calculations
 - 6. Point-to-point CAD drawings
- B. Submit fire alarm equipment supplier qualifications submitted indicating years in business, service policies, warranty definitions, and a list of similar installations. No system shall be considered unless

there is a locally staffed office offering parts and service within a 50 mile radius of the job site.

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

1.04 RELATED WORK SPECIFIED ELSEWHERE

- A. Duct smoke detectors shall be installed by the Mechanical Contractor, but furnished, wired and connected to the fire alarm system by the Electrical Contractor.

PART 2 - PRODUCTS

2.01 SYSTEM DESIGN

- A. Provide a fully operational and functional addressable fire detection system. The system shall be electrically supervised against opens and grounds on both station and signal wiring. Opens and grounds shall cause a trouble bell to sound at the control panel until manually silenced by the trouble bell silencing switch and shall not cause a false alarm to be sounded. Basic power supply for the system shall be 120 volts AC supplied from the emergency power system. Operation of all system components shall be 25 volts DC furnished by step down transformers and rectifiers within the control panel. The system shall allow for loading or editing special instructions and operation sequences as required. Software operations shall be stored in non-volatile programmable memory. Loss of primary and secondary power shall not erase the instructions stored in memory.
- B. The sequence of operation shall be that actuation of any manual or automatic sensors shall cause:
 - 1. All building alarm devices to sound
 - 2. Shut-down of all ventilation equipment
- C. Pressing the appropriate acknowledge button shall acknowledge any alarm or trouble condition. After the points have been acknowledged, the LED's shall glow steady and the panel audible signal will be silenced.
- D. The System Reset button shall be used to return the system to its normal state after an alarm condition has been remedied. Should the alarm condition continue to exist, the system will remain in an abnormal state.

2.02 CONTROL PANEL

- A. Control panel: fully modular type with all necessary control modules for system operation. Cabinet: constructed of code gauge steel with latch and cylinder type lock, semi-recessed mounted.
- B. Provide control modules, device alarm modules, signal modules, power supply module, automatic dual-rate battery charger and sealed, rechargeable type, electrolyte battery within the control panel.

2.03 PERIPHERAL DEVICES - INITIATING

- A. Manual stations: non-code type, located as shown on the drawings. Stations shall be semi-flush and remain mechanically locked until manually reset. Mount stations with the base at four feet above finished floor and no more than five feet from any door, measured horizontally.

2.04 PERIPHERAL DEVICES - SIGNALING

- A. Visual devices: xenon flash tube strobe indicator. The lamp shall produce a candela level per NFPA at a flash rate of one flash per second. The unit shall be self rimmed and not require trim kit for semi-flush mount.

2.05 SPARE PARTS

- A. Provide each of the following listed devices as spare parts to the Owner:
 - 1. One of each manual station
 - 2. Two of each visual alarm

2.06 WIRING

- A. Provide in accordance with NEC (Section 70 of NFPA) and Manufacturer's instructions, wiring, raceways, conduit and outlet boxes required for the erection of a complete system as described herein and as shown on the drawings. Install wiring in metallic conduit and of the approved type for fire alarm use. Wire and cable shall be UL listed and a minimum of 18 AWG or as required by local codes and the LAHJ. A consistent color code shall be used throughout and all wires shall be tagged at all junction points between conductors. Final connections between control equipment and the wiring system shall be made under direct supervision of a representative of the Manufacturer. Raceways containing conductors identified as "Fire Protective Alarm System" conductors shall not contain any other conductors and no AC or audio current carrying conductors shall be allowed in the same raceway with the D.C. fire alarm detection and signaling conductors.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Tag wires at junction points and at connections to equipment. Wire markers shall be of the taped band type of permanent material and shall be suitable and permanently stamped with the proper identification. The markers shall be attached in a manner that will not permit accidental detachment. Wiring shall test free from opens, grounds, and short circuits. Final connections between equipment and the wiring system shall be made under the supervision of a representative of the Manufacturer.
- B. Wiring for the fire alarm system shall be laid out in the most convenient form for this installation, and all such wiring shall be shown on the as-built drawings which are required under this Division of the specifications. As-built drawings shall also clearly indicate any connections and integration with the existing fire alarm system, as required. A wiring diagram shall be mounted inside the door of the fire alarm control panel.
- C. Provide two copies of completed instructions covering the operation and maintenance of the installed system, including circuit drawings and wiring diagrams of the system as actually installed, including as-built building alarm wiring. A complete list of part numbers and names, together with the name of the Manufacturer, shall be included in each manual.
- D. All equipment shall be held firmly in place. Fastening and supports shall be adequate to support the loads with a safety factor of five.
- E. Addressable devices connected to the fire alarm system shall be identified at the control panel by the room numbers/names assigned by the Owner. The room numbers/names shown on the drawings are

for reference only.

3.02 TESTS AND REPORTS

- A. Final Acceptance
 - 1. The system will be accepted only after a satisfactory test of the entire system has been accomplished by a factory-trained distributor in the presence of a representative of the Authority Having Jurisdiction and Owner's Representative.
- B. On-Site Services
 - 1. Provide the on-site services of an authorized technical representative of the Manufacturer to supervise all connections and fully test all devices and components of the system as installed. Owner's representative shall be instructed in the proper use and testing of the system.

3.03 WARRANTY

- A. Warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the complete and certified test or from the date of first beneficial use.
- B. The Equipment Manufacturer shall make available to the Owner a maintenance contract proposal to provide a minimum of two (2) inspections and tests per year in compliance with NFPA-72H guidelines.

END OF SECTION

SECTION 267500

MISC. SYSTEMS

PART 1 - GENERAL

1.01 SCOPE

- A. Provide empty conduit systems as indicated on the drawings and as required by the Telephone Company and Data Systems provider.

PART 2 - PRODUCTS

2.01 CONDUIT

- A. Conduit shall be as specified under Section 261000 B BASIC MATERIALS AND METHODS.

2.02 OUTLET BOXES

- A. Outlet boxes shall be as specified under Section 261000 B BASIC MATERIALS AND METHODS

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Conduits shall contain a nylon pull wire.

END OF SECTION