

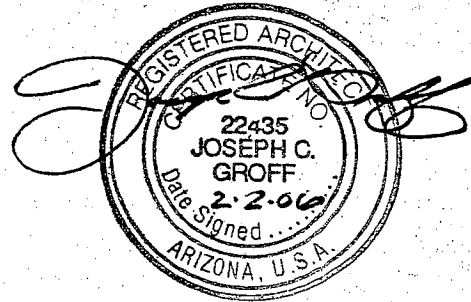
JR Copy

PROJECT MANUAL

HOMESTEAD COMMUNITY CENTER

AND

SALES OFFICE



January 20, 2006

Body Color :

Trim Color :

Windows :

Doors :

Stone :

Roof Tiles :

Both Endwalls :

CCBG Architects, Inc.
102 East Buchanan Street
Phoenix, Arizona 85004
602-258-2211
Fax: 602-255-0909

TABLE OF CONTENTS

HOMESTEAD COMMUNITY CENTER & SALES OFFICE

Masterformat Section No.	Section Name	No. of Pages
CS	Cover Sheet	
00010	Table of Contents.....	3
 DIVISION 1 - GENERAL REQUIREMENTS		
01110	Summary of Work.....	2
01250	Contract Modification Procedures.....	2
01290	Payment Procedures.....	3
01310	Project Management and Coordination.....	5
01315	Contractor's Requests for Information.....	3
01316	Request for Information - Form.....	1
01320	Construction Progress Documentation.....	5
01330	Submittal Procedures.....	5
01420	References and Definitions.....	11
01430	Quality Control Requirements.....	4
01500	Temporary Facilities and Controls.....	6
01600	Product and Material Requirements.....	4
01650	Substitution Request (After the Bidding Phase) - Form.....	2
01700	Execution Requirements.....	5
01730	Cutting and Patching.....	4
01770	Closeout Procedures.....	7
 DIVISION 2 - SITEWORK		
02300	Earthwork.....	10
02360	Soil Treatment.....	4
02740	Asphalt Paving.....	5
02765	Pavement Markings.....	2
02770	Concrete Paving, Curbs and Driveways.....	4
02790	Tennis and Pickleball Courts.....	4
02822	Site Fencing and Gates.....	2
02841	Wheel Stops.....	1
02870	Site Furnishings.....	2
02890	Traffic Control Signs.....	2
	Landscaping – Provided by Others.....	refer to Drawings
 DIVISION 3 - CONCRETE		
03300	Cast-in-Place Concrete.....	17
03380	Post Tensioned Concrete.....	9
 DIVISION 4 - MASONRY		
04220	Unit Masonry Assemblies.....	9
04710	Simulated Stone.....	7

DIVISION 5 - METALS

05500 Metal Fabrications8

DIVISION 6 - WOOD AND PLASTICS

06100 Rough Carpentry6
06175 Wood Trusses5
06180 Glue-Laminated Members3
06400 Architectural Woodwork6
06670 Fiberglass Reinforced Plastic (FRP) Panels2

DIVISION 7 - THERMAL & MOISTURE PROTECTION

07210 Building Insulation2
07320 Roofing Tiles5
07600 Sheet Metal Flashing and Trim3
07720 Roof Accessories3
07900 Joint Sealants10

DIVISION 8 - DOORS & WINDOWS

08110 Steel Doors and Frames4
08210 Wood Doors4
08310 Access Doors and Frames2
08330 Overhead Coiling Doors4
08410 Aluminum Entrances and Storefronts8
08520 Aluminum Windows6
08620 Unit Skylights3
08710 Door Hardware19
08800 Glazing6

DIVISION 9 - FINISHES

09220 Portland Cement Plaster (Stucco)6
09250 Gypsum Board6
09310 Tile6
09652 Sheet Vinyl Floor Coverings4
09680 Carpet5
09750 Stone Countertops4
09820 Acoustical Insulation2
09900 Painting13

DIVISION 10 - SPECIALTIES

10305 Manufactured Fireplaces2
10350 Flagpoles3
10400 Signs3
10506 Wood Lockers5
10520 Fire Protection Specialties3
10650 Operable Panel Partitions5

10800 Toilet Accessories2

DIVISION 11 - EQUIPMENT

11450 Residential Appliances2
11451 Ceiling Fans1

DIVISION 12 - FURNISHINGS

Not used

DIVISION 13 - SPECIAL CONSTRUCTION

Not used

DIVISION 14 - CONVEYING SYSTEMS

Not used

DIVISION 15 - MECHANICAL

As indicated on Drawings

DIVISION 16 - ELECTRICAL

As indicated on Drawings

END OF TABLE OF CONTENTS

SECTION 01110

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Administrative and procedural requirements, including but not limited to:
1. Project identification and description.
 2. Work under other contracts.
 3. Owner furnished items.
 4. Contractor use of site.
 5. Owner occupancy.
 6. Miscellaneous provisions.

1.2 SUMMARY OF WORK

- A. Project: Project consists of construction of new Sales Center, 2800 s.f. and a Community Center, 8456 s.f.
- B. Architect: The Contract Documents were prepared for Project by CCBG Architects, Inc., 102 East Buchanan Street, Phoenix, Arizona 85004.
- C. Base Bid: The bid shall include labor, material, equipment, services and transportation necessary for the construction of the Project.

1.3 USE OF SITE

- A. Contractor: Contractor shall have full use of Project site for construction operations during construction period. Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.

1.4 OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building.
 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.
- B. Owner Operations:
1. At no time during the work shall Contractor place, or cause to be placed, materials or equipment, or other items, at a location that would impede or impair access to or from the present facilities for customers, employees or delivery personnel.

2. Contractor shall cooperate with the Owner in providing traffic control during course of construction in order to minimize inconvenience to Owner's customers.
3. Utility service to existing building(s) shall not be interrupted without prior written approval from Owner.

1.5 PERMITS, FEES AND NOTICES

- A. Plan check fees have been paid by the Owner.
- B. The Contractor shall secure and pay for the building permit and for other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required at the time the bids are received or negotiations concluded. This shall include, but not be limited to:
 1. Building Permit from City of Maricopa.
 2. Inspections and Certificates from State Fire Marshal and County Health Department.
- C. The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authority bearing on the performance of the Work.
- D. It is the intent of the Architect that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. Contractor shall notify Architect and Owner immediately if Contractor observes that the Contract Documents are at variance with this intent in any respect. Architect will make any necessary changes.
- E. If the Contractor performs Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect and Owner, the Contractor shall assume full responsibility therefore and shall bear attributable costs.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01250

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, "Architect's Supplemental Instructions."

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. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 20 days 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 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 unforeseen conditions require modifications to the Contract, Contractor may propose changes 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 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.
 - 5. Comply with requirements in Section 01600 – Product and Material Requirements if the proposed change requires substitution of one product or system for product or system specified.

- C. Proposal Request Form: AIA Document G709.

1.4 CHANGE ORDER PROCEDURES

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

1.5 CONSTRUCTION CHANGE DIRECTIVE

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

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01290

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. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Submittals Schedule and Application for Payment forms with Continuation Sheets (AIA Document G703 Continuation Sheet).
 2. Submit the Schedule of Values to Architect at earliest possible date but no later than 7 days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Indicate the scheduled value of major categories and subcontracts for the Work.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value: Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide several line items for principal subcontract amounts, where appropriate.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Identify temporary facilities and other major cost items that are not direct cost of actual work-in-place as either separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

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

1.3 APPLICATIONS FOR PAYMENT

A. General:

1. Each Application for Payment shall be consistent with previous applications, except as otherwise required herein, and payments as certified by Architect and paid for by Owner.
2. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor, or, if not indicated, the 15th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 15 days before the date for each progress payment.
3. Payment Application Forms: AIA Document G702 and AIA Document G703 Continuation Sheets.
4. 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.
 - a. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - b. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect. 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.

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

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit 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 proceeded by final waivers from every entity involved with performance of the Work covered by the application that is lawfully entitled to a lien.

D. Initial Application for Payment: Include the following administrative actions and submittals prior to, or with, submittal of first Application for Payment:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Submittals Schedule (preliminary if not final).
5. List of Contractor's staff assignments.
6. Copies of building permits.
7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
8. Certificates of insurance and insurance policies.
9. Performance and payment bonds.
10. Data needed to acquire Owner's insurance.

- E. Application for Payment at Substantial Completion: After issuing 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. Application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- F. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, 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, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01310

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. General project coordination procedures.
 2. Conservation.
 3. Coordination Drawings.
 4. Administrative and supervisory personnel.
 5. Project meetings.

1.2 COORDINATION

- A. Coordination: Coordinate construction operations to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations 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 with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and 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. Preinstallation conferences.
 7. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.3 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Indicate relationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
 3. Refer to Division 15 Section "Basic Mechanical Materials and Methods" and Division 16 Section "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for mechanical and electrical installations.
- B. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including emergency contact numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.4 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees:
 - a. Authorized representatives of Owner
 - b. Construction Manager
 - c. Architect, and their consultants
 - d. Contractor and its superintendent
 - e. Major subcontractors; manufacturers; suppliers; and other concerned parties.
 - f. All 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, but not limited to, the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.

- j. Use of the premises.
- k. Responsibility for temporary facilities and controls.
- l. Parking availability.
- m. Office, work, and storage areas.
- n. Equipment deliveries and priorities.
- o. First aid.
- p. Security.
- q. Progress cleaning.
- r. Working hours.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees:
 - a. 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.
 - b. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including, but not limited to, requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Submittals.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Space and access limitations.
 - r. Regulations of authorities having jurisdiction.
 - s. Testing and inspecting requirements.
 - t. Required performance results.
 - u. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements.
4. 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. Pre-Progress Meeting: If requested by Architect, conduct a pre-progress meeting prior to Progress Meeting.

1. Attendees: Owner, Architect, Contractor.

E. Progress Meetings: Conduct progress meetings at b-weekly intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees:
 - a. Representatives of Owner
 - b. Architect

- c. 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.
 - d. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. 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.
 - b. Review present and future needs of each entity present, including, but not limited to the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
 - 14) Documentation of information for payment requests.
3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- 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.
- F. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
- 1. Attendees:
 - a. Representatives of Owner
 - b. 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.
 - c. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including, but not limited to, the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01315

CONTRACTOR'S REQUEST FOR INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Administrative requirements for Request for Information.

1.2 DEFINITIONS

- A. Request for Information: A document submitted by the Contractor requesting information or clarification of a portion of the Contract Documents that is required to properly perform the work, hereinafter referred to as an RFI.
1. Request shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Architect. In the RFI form the Contractor shall set forth their own interpretation or understanding of the requirement along with reasons why they have reached such an understanding. The Architect will review all RFIs to determine whether the RFI is within the meaning of this term.
- B. Proper RFIs:
1. A properly prepared Request for Information shall include a detailed written statement that indicates the specific drawing or specification section in need of clarification and the nature of the clarification requested.
 - a. Drawing(s) shall be identified by drawing number and location on the drawing sheet.
 - b. Specification shall be identified by section number, page and paragraph.
- C. Improper RFIs:
1. RFIs that are not properly prepared and may be processed by the Architect at the Architect's standard hourly rate and the Architect may charge the Owner. Such costs will be deducted from monies still due the Contractor. The Contractor will be notified by the Architect prior to the processing of improper RFIs.
- D. Frivolous RFIs:
1. Frivolous RFIs are RFIs that request information that is clearly shown on the Contract Documents.
 2. Frivolous RFIs may be returned unanswered or may be processed by the Architect at the Architect's standard hourly rate and the Architect may charge the Owner. Such costs will be deducted from monies still due the Contractor. The Contractor will be notified by the Architect prior to the processing of frivolous RFIs.

1.3 CONTRACTOR'S REQUEST FOR INFORMATION

- A. When the Contractor is unable to determine from the Contract Documents the material, process or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item.
1. Wherever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the Architect.
 2. If clarification of an item is required of a document known to have been prepared by a consultant to the Architect, the Contractor may NOT direct the RFI directly to the consultant. Each RFI shall be processed through the Architect.

- B. RFI's shall be submitted on Document 01316 included in the Project Manual.
 - 1. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after photocopying or transmission by facsimile (fax).
 - 2. RFI's shall be submitted in numerical order with no breaks in the consecutive numbering.
 - 3. Each page of attachments to RFI's shall bear the RFI number and shall be consecutively numbered in chronological order.
 - 4. RFI's may be submitted by E-Mail.
 - a. Address for E-Mail will be distributed by the Architect at the Pre-Construction Conference.
 - b. An electronic version of Document 01316 will be provided upon request.
- C. Contractor shall endeavor to keep the number of RFI's to a minimum. In the event that the process becomes unwieldy, in the opinion of the Architect, because of the number and frequency of RFI's submitted, the Architect may require the Contractor to abandon the process and submit future requests as either submittals, substitutions or requests for change.
- D. RFIs shall be originated by the Contractor.
 - 1. RFIs from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect.
 - 2. RFIs sent by a subcontractor or material supplier directly to the Owner, Owner's Representative, Architect or the Architect's consultants shall not be accepted and will be returned unanswered.
- E. Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFIs which request information available in the Contract Documents will be deemed "frivolous" as defined herein.
- F. In cases where RFIs are issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically and similar items the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale and submit same with the RFI. RFIs which fail to include a suggested solution will be returned unanswered with a requirement that the Contractor submit a complete request.
- G. RFIs shall not be used for the following purposes:
 - 1. To request approval of submittals.
 - 2. To request approval of substitutions.
 - 3. To request changes which entail additional cost or credit.
 - 4. To request methods of performing work different than those shown or specified.
- H. The Contractor shall prepare and maintain a log of RFIs. Upon request by the Owner or Architect, the Contractor shall furnish copies of the log showing outstanding RFIs. The Contractor shall note unanswered RFIs in the log.

1.4 ARCHITECT'S RESPONSE TO RFIs

- A. Contractor shall allow 5 days for the Architect's review and response time for RFIs, after receipt at Architects office, however, the Architect will endeavor to respond in less time. If additional time is required beyond the 5 days allowed, the Architect shall notify the Contractor in writing.
 - 1. RFI shall state requested date/time for response, however, this requested date/time for response is not a guarantee that the RFI will be answered by that date/time if that date/time is too expeditious.
- B. Architect will respond to properly prepared RFIs on one of the following forms:
 - 1. Directly upon the RFI Form
 - 2. Notice of Clarification (NOC)

3. Request for Proposal form.
- C. Improper or frivolous RFIs shall be subject to one of the following:
1. A Notification of Processing Fee(s).
 2. Unanswered and returned with the notation: Not Reviewed.
- D. The Architect may opt to retain RFIs for discussion during regularly scheduled project meetings for inclusion of responses in meeting minutes in lieu of responding in written form.
- E. Responses from the Architect will not change any requirement of the Contract Documents unless so noted by the Architect in the response to the RFI. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Documents, the Contractor shall immediately give written notice to the Architect stating that the Contractor considers the response to be a Change Order. Failure to give written notice within 14 days shall waive the Contractor's right to seek additional time or cost.
1. Answered RFIs shall not be construed as approval to perform extra work.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not Used

END OF SECTION

DOCUMENT 01316

REQUEST FOR INFORMATION - FORM

Project: Homestead Community Center and Sales Center
R.F.I Number: _____
From: _____
To: _____
Date: _____
A/E Project Number: CCBG 0428

Specification Section: Paragraph: Drawing Reference: Detail

Request:

* Requested Date/Time for Response:

Signed by: _____

Response:

Attachments

Response From: To: * Date Rec'd: * Date Ret'd:

Signed by: _____

Copies: ___ Owner ___ Consultants _____ File

* Contractor shall allow up to 5 working days review and response time for RFI'S, unless review is required of multiple consultants, then the review and response period shall be 7 working days. (See Section 01315 – Contractor's Request for Information).

SECTION 01320

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. Submittals Schedule.
 3. Daily construction reports.
 4. Field condition reports.
 5. Construction photographs.

1.2 DEFINITIONS

- A. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- B. 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.
- C. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- D. Major Area: A story of construction, a separate building, or a similar significant construction element.

1.3 SUBMITTALS

- A. Submittals Schedule:
1. Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category (action or informational).
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 2. Submit 3 copies of schedule.
 3. If requested by Architect, provide electronic copy for Architect's use.
- B. Preliminary Network Diagram: Submit 2 printed copies:
1. First copy: Single sheet of reproducible media.
 2. Second copy: Print, large enough to show entire network for entire construction period.
- C. Contractor's Construction Schedule: Submit 2 printed copies of initial schedule.
1. First copy: Reproducible media.
 2. Second copy: Blue or black-line print, large enough to show entire schedule for entire construction period.

- D. CPM Reports: Concurrent with CPM schedule, submit 3 printed copies of each of the following computer-generated reports. Each activity identified 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.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
- E. Construction Photographs: Submit 2 prints of each photographic view within 7 days of taking photographs.
- F. Daily Construction Reports: Submit 2 copies at weekly intervals.
- G. Field Condition Reports: Submit 2 copies at time of discovery of differing conditions.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
- C. Coordinate access to Project site with photographer and provide auxiliary services requested, including use of temporary facilities including temporary lighting.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONSTRUCTION SCHEDULE

- A. General: Submit Contractor's Construction Schedule within 10 calendar days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project. Submit updated schedule with each application for payment.

- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Indicated separate activities, broken down by trade or material, including the following information:
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 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 time frames as indicated in Section 01330 – Submittal Procedures. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include time frame recommended by product and system manufacturers for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- D. Contract Modifications: Submit a revised schedule with each proposed contract modification, demonstrating the effect of the proposed change on the overall project schedule.
1. Format: Schedule may be by CPM or bar graph (Gantt chart) type.
 2. Gantt: Comprehensive, fully developed, horizontal Gantt-chart-type indicating each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - a. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.
 3. CPM: Prepare Contractor's Construction Schedule using a CPM network analysis diagram.
 - a. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
 - b. 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.
 - c. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - d. Unit of Time: One workday.
 - e. Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
 - f. 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:
 - 1) Preparation and processing of submittals.
 - 2) Purchase of materials.
 - 3) Delivery.
 - 4) Fabrication.
 - 5) Installation.

- g. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 - h. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - i. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
 - 1) Contractor or subcontractor and the Work or activity.
 - 2) Description of activity.
 - 3) Principal 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.
- E. 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 the following:
 - a. Changes in early and late start dates.
 - b. Changes in early and late finish dates.
 - c. Changes in activity durations in workdays.
 - d. Changes in the critical path.
 - e. Changes in total float or slack time.
 - f. Changes in the Contract Time.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- F. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
- 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording events at Project site, including the following:
- 1. List of subcontractors and numbers of associated workers with each trade.
 - 2. High and low temperatures and general weather conditions.
 - 3. Accidents.
 - 4. Stoppages, delays, shortages, and losses.
 - 5. Meter readings and similar recordings.
 - 6. Orders and requests of authorities having jurisdiction.
 - 7. Services connected and disconnected.
 - 8. Equipment or system tests and startups.

- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information Section 01316 – Request for Information – Form. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Contractor takes construction photographs.
- B. Digital Photographs:
 - 1. Resolution: Minimum 2 megapixel resolution.
 - 2. Prints: Minimum 4 inches x 5 inches printed on photographic paper specifically intended for prints of digital photographs.
 - 3. CD-Rom: Submit a CD-Rom containing photographs in JPEG format, with an index, as part of closeout documents
- C. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following:
 - 1. Name of Project.
 - 2. Name and address of photographer.
 - 3. Name of Architect.
 - 4. Name of Contractor.
 - 5. Date photograph was taken.
 - 6. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- D. Date Stamp: Date and time stamp each photograph as it is being taken so stamp is integral to photograph.
- E. Pre-construction Photographs: Take sufficient photographs prior to commencing work to indicate existing conditions, including, but not limited to, landscape, buildings, site features and furnishings.
- F. Periodic Construction Photographs: Take 4 color photographs monthly, coinciding with cutoff date associated with each Application for Payment. Photographer shall select vantage points to best show status of construction and progress since last photographs were taken.
 - 1. Field Office Prints: Retain one set of prints of periodic photographs in field office at Project site, available at all times for reference. Identify photographs the same as for those submitted to Architect.

PART 3 - EXECUTION

Not used

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Section 01320 - Construction Progress Documentation for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
 - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Allow 15 days for processing each resubmittal.
 - 4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- D. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.

- f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Unique identifier, including revision number.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review or will discard submittals received from sources other than Contractor.
- 1. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 - 2. Transmittal Form: Use AIA Document G810.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- 1. Number of Copies: Submit 3 copies of each submittal, unless otherwise indicated. Architect will return 2 copies. Mark up and retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
- 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Printed performance curves.
 - g. Operational range diagrams.
 - h. Compliance with recognized trade association standards.
 - i. Compliance with recognized testing agency standards.

- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Notation of coordination requirements.
 - j. Notation of dimensions established by field measurement.
 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
- D. Coordination Drawings: As specified in Section 01310 - Project Management and Coordination.
- E. Samples: Prepare physical units of materials or products, including the following:
1. 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. 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.
 2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, 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.
 3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side.
 4. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- F. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location.
- G. Submittals Schedule: As specified in Section 01320 - Construction Progress Documentation.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit 2 copies of each submittal, unless otherwise indicated. Architect will not return copies.

2. Certificates and Certifications: Provide a notarized 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.
 3. Test and Inspection Reports: Comply with requirements in Section 01430 – Quality Control Requirements.
- B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
 - C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
 - D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
 - E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
 - F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
 - G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
 - H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
 - I. Compatibility Test Reports: Prepare 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.
 - J. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, 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.
 - K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. 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.
 - L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
 - M. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Section 01770 – Contract Closeout.

- N. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- O. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- P. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.
- Q. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- R. Construction Photographs: Comply with requirements in Section 01320 - Construction Progress Documentation.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

SECTION 01420

REFERENCES AND DEFINITIONS

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. "Approved equal", "or equal" shall mean as approved and accepted by the Architect and Owner.
- D. "As necessary" means essential to the completion of the work.
- E. "As required" means as required by the contract documents.
- F. "As selected", "as approved" or words of similar import mean as selected by, as approved by, or as accepted by the Architect and Owner.
- G. "As shown", "as detailed", "as indicated" or words of similar import mean "as indicated on the drawings" unless otherwise noted.
- H. "Concealed" means not visible in the finished work.
- I. "Days" means calendar days.
- J. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- K. "Exposed" means visible in the finished work.
- L. "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."
- M. "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.
- N. "Furnish": Purchase and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- O. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, connecting, and similar operations.
- P. "Provide": Furnish and install, complete and ready for the intended use.

- Q. "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- R. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of 5 previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- S. "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.
- T. "Shall": Means "mandatory".
- U. Substantial Completion: That stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

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. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, request clarification from Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
- E. Abbreviations and Acronyms for 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. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG Americans with Disabilities Act (ADA)
 Accessibility Guidelines for Buildings and Facilities
 Available from Access Board
 www.access-board.gov

(800) 872-2253
(202) 272-5434

CFR	Code of Federal Regulations Available from Government Printing Office www.access.gpo.gov/nara/cfr	(888) 293-6498 (202) 512-1530
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-5434

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 in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(202) 862-5100
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.aashto.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ACI	American Concrete Institute/ACI International www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
ADC	Air Diffusion Council www.flexibleduct.org	(312) 201-0101
AFPA	American Forest & Paper Association (See AF&PA)	
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000

AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association www.ahardbd.org	(847) 934-8800
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALA	American Laminators Association (See LMA)	
ALCA	Associated Landscape Contractors of America www.alca.org	(800) 395-2522 (703) 736-9666
ALSC	American Lumber Standard Committee	(301) 972-1700
ANLA	American Nursery & Landscape Association (Formerly: AAN - American Association of Nurserymen) www.anla.org	(202) 789-2900
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(941) 454-6989
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (212) 591-7722

ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	American Society for Testing and Materials www.astm.org	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industries International) www.awci.org	(703) 534-8300
AWPA	American Wood-Preservers' Association www.awpa.com	(817) 326-6300
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
CCC	Carpet Cushion Council www.carpetcushion.org	(203) 637-1312
CCFSS	Center for Cold-Formed Steel Structures www.umn.edu/~ccfss	(573) 341-4471
CDA	Copper Development Association Inc. www.copper.org	(800) 232-3282 (212) 251-7200
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(800) 463-6727 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300

DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIMA	EIFS Industry Members Association www.eifsfacts.com	(800) 294-3462 (770) 968-7945
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
FGMA	Flat Glass Marketing Association (See GANA)	
FM	Factory Mutual System (See FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America (Formerly: FGMA - Flat Glass Marketing Association) www.glasswebsite.com/gana	(785) 271-0208
GTA	Glass Tempering Division of Glass Association of North America (See GANA)	
HMMA	Hollow Metal Manufacturers Association (See NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
ICRI	International Concrete Repair Institute (The) www.icri.org	(703) 450-0116
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690

LGSI	Light Gage Structural Institute www.loseke.com	(972) 370-0967
LMA	Laminating Materials Association (Formerly: ALA - American Laminators Association) www.lma.org	(201) 664-2700
LSGA	Laminated Safety Glass Association (See GANA)	
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MCA	Metal Construction Association www.metalconstruction.org	(312) 201-0193
MFMA	Maple Flooring Manufacturers Association www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association	(312) 644-6610
MIA	Marble Institute of America www.marble-institute.com	(614) 228-6194
ML/SFA	Metal Lath/Steel Framing Association (See SSMA)	
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(303) 697-8441
NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-6372
NGA	National Glass Association www.glass.org	(703) 442-4890

NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-70318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association www.nofma.org	(901) 526-5016
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSA	National Stone Association www.aggregates.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo and Mosaic Association, Inc. www.ntma.com	(800) 323-9736 (703) 779-1022
NWWDA	National Wood Window and Door Association (See WDMA)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting and Decorating Contractors of America www.pdca.com	(800) 332-7322 (703) 359-0826
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (508) 230-3516
RMA	Rubber Manufacturers Association www.rma.org	(800) 220-7620 (202) 682-4800
SDI	Steel Deck Institute www.sdi.org	(847) 462-1930
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIGMA	Sealed Insulating Glass Manufacturers Association www.sigmaonline.org/sigma	(312) 644-6610
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980

SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPI	The Society of the Plastics Industry www.plasticsindustry.org	(202) 974-5200
SPRI	SPRI (Single Ply Roofing Institute) www.spri.org	(781) 444-0242
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSMA	Steel Stud Manufacturers Association (Formerly: ML/SFA - Metal Lath/Steel Framing Association) www.ssma.com	(312) 456-5590
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(800) 837-8303 (412) 281-2331
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing, and Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
UL	Underwriters Laboratories Inc. www.ul.com	(800) 704-4050 (847) 272-8800
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Formerly: AWCMA - American Window Covering Manufacturers Association) www.windowcoverings.org	(800) 506-4653 (212) 661-4261
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WIC	Woodwork Institute of California www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591

WWPA Western Wood Products Association (503) 224-3930
www.wwpa.org

B. 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. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA BOCA International, Inc. (708) 799-2300
www.bocai.org

CABO Council of American Building Officials
(See ICC)

IAPMO International Association of Plumbing and Mechanical
Officials (The) (909) 595-8449
www.iapmo.org

ICBO International Conference of Building Officials (800) 284-4406
www.icbo.org (562) 699-0541

ICC International Code Council (703) 931-4533
(Formerly: CABO - Council of American Building
Officials)
www.intlcode.org

SBCCI Southern Building Code Congress International, Inc. (205) 591-1853
www.sbcci.org

C. 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. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE Army Corps of Engineers
www.usace.army.mil

CPSC Consumer Product Safety Commission (800) 638-2772
www.cpsc.gov (301) 504-0990

DOC Department of Commerce (202) 482-2000
www.doc.gov

EPA Environmental Protection Agency (202) 260-2090
www.epa.gov

FAA Federal Aviation Administration (202) 366-4000
www.faa.gov

FCC Federal Communications Commission (202) 418-0190
www.fcc.gov

FDA Food and Drug Administration (888) 463-6332
www.fda.gov

GSA	General Services Administration www.gsa.gov	(202) 708-5082
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(202) 693-1999
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01430

QUALITY CONTROL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SUBMITTALS

- A. Qualification Data: Include proof of qualifications for testing agencies in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Ambient conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- C. Permits, Licenses, and Certificates: Submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, and notices, receipts for fee payments, judgments, correspondence, records, and similar documents, for Owner's records.

1.3 QUALITY ASSURANCE

- A. 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.
- B. 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.

- C. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. **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.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. **Testing Agency Qualifications:** An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.4 TESTS AND INSPECTIONS

- A. **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 inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- B. **Special Tests and Inspections:** Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner and as indicated on Drawings.
 - 1. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 - 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 5. Testing agency will retest and reinspect corrected work.
 - 6. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 - 7. 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.
- C. **Contractor Responsibilities:**
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- D. **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.
- E. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- F. **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. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Distribute copies of a certified written report, of each test, inspection, and similar quality-control service as follows:
 - a. 2 copies to the Architect
 - b. 1 copy to the Structural Engineer
 - c. 2 copies to the Contractor
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- G. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.

1.5 QUALITY CONTROL

- A. Where Specifications require that a particular product be installed and/or applied by an Applicator approved by the Manufacturer, it is the Contractor's responsibility to ensure that Subcontractor employed for such Work is approved. Such Subcontractor(s) shall provide evidence of being approved when requested by the Architect.
1. Work shall be executed by mechanics skilled in the Work required. Conform to the methods, standards and accepted practices of the Trade or Trades involved.

- B. Each Section includes a list of Manufacturers whose equipment is acceptable as to manufacture, subject to conformance with the Contract Documents. Careful checking must be made by the Contractor and the manufacturer or equipment supplier to verify that the equipment will meet all capacities, requirements, and space allocations and is suitable to the intended purpose.
- C. Conflicting Requirements: If Contract Documents conflict with manufacturer's written instructions for minimum installation procedures, assume the more stringent applies and request confirmation from Architect for a decision before proceeding.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

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

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

1.2 SUBMITTALS

- A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

1.3 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
- B. Comply with codes and regulations regarding potable drinking water, sanitation, dust control, fire protection, and other temporary controls.
1. Electric Service: Comply with NFPA, NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- C. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.
3. If existing facilities are used, maintain facilities in a clean condition acceptable to Owner.
- C. Disruption of Existing Utilities: Coordinate potential disruptions to utility service with Owner. Notify Owner's Representative and Architect a minimum of 72 hours prior to proposed utility interruptions and receive written notice to proceed before interrupting any utility.

PART 2 - PRODUCTS

2.1 EQUIPMENT, FACILITIES AND CONTROLS

- A. General:
1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.

2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, as approved by Owner.
- B. Site Enclosure Fence:
1. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch- OD corner and pull posts.
 2. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
 3. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations. Close and lock after construction hours.
- C. Field Offices: Weather-tight, with lockable entrances, operable windows, and serviceable finishes; on foundations adequate for normal loading.
1. Size: Sufficient to accommodate required office personnel and meetings of 24 persons at Project site.
 2. Furnishings: Desk, chairs, file cabinets, a plan table, a plan rack, and bookcase.
 3. Provide the following:
 - a. Electric heater.
 - b. Air-conditioning unit capable of maintaining an indoor temperature of 72 deg F.
 - c. Fluorescent light fixtures
 - d. 110- to 120-V duplex outlets.
 4. Locate temporary offices at location as directed by Architect or Owner.
- D. Fire Protection:
1. Comply with fire insurance and governing regulations.
 2. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 - a. Provide adequate number of fire extinguishers to protect the Work.
 3. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
- E. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
- F. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 2. Toilets: Provide self-contained single occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Provide separate facilities for male and female personnel.
 3. Wash Facilities: Install wash facilities supplied with potable water at locations as required for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
- G. Drinking-Water Fixtures: Provide potable water, including paper cup supply.

- H. Heating and Cooling: Provide temporary heating and cooling required by construction activities.
1. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities.
 2. Heating Equipment: Provide and pay for heating devices and heat as required to maintain specified conditions for construction operations.
 - a. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.
- I. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- J. Electric Service:
1. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
 - a. Install electric power service underground, unless overhead service must be used.
 - b. Install power distribution wiring overhead and rise vertically where least exposed to damage.
 2. Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
 3. Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
- K. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 2. Provide the following:
 - a. One 100-W incandescent lamp per 500 sq. ft., uniformly distributed, for general lighting, or equivalent illumination.
 - b. One 100-W incandescent lamp every 50 feet in traffic areas.
 - c. One 100-W incandescent lamp per story in stairways and ladder runs, located to illuminate each landing and flight.
 3. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
- L. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities. Install separate telephone line for each field office and first-aid station.
1. Provide additional telephone lines for the following:
 - a. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone line for each facsimile machine and computer with modem in each field office.
 2. Provide messaging system on superintendent's telephone.
 3. Furnish superintendent with electronic paging device, portable two-way radio or portable cellular telephone for use when away from field office.
 4. Install a coin-operated telephone station for use by construction personnel.

- M. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Do not permit installation of unauthorized signs except as required by law.
1. Engage an experienced sign painter to apply graphics for Project identification signs. Colors, pattern and verbiage shall be as directed by Architect.
 2. Prepare temporary signs to provide directional information to construction personnel and visitors.
 3. Install signs where indicated or as directed by Architect.
- N. Storage and Fabrication Sheds: Provide sheds or adequate size to accommodate stored materials and equipment.
1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
- O. Temporary Stairs: Provide temporary stairs where ladders are not adequate. Cover finished permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.
- P. Existing Stair Usage: Use of Owner's existing stairs will be permitted. 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, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.
- Q. Sewers and Drainage: Provide temporary connections to existing sewers to remove effluent that can be discharged lawfully. If sewers are not available, provide drainage ditches, dry wells, stabilization ponds, and similar facilities acceptable by law. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 2. Connect temporary sewers to existing system as directed by sewer department officials.
 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
 4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.
- R. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas as indicated on Drawings.
1. Provide and maintain access to fire hydrants, free of obstructions.
 2. Provide means of removing mud from vehicle wheels before entering streets.
 3. Designated existing on-site roads may be used for construction traffic.
 4. Access roads shall be capable of supporting imposed loads of all emergency vehicles.
- S. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Section 01700 - Execution Requirements for progress cleaning requirements.
1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
 2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

- T. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Provide lighting, including flashing red or amber lights as required.
- U. Water Control:
1. Grade site to drain. Maintain excavations free of water. Provide, operate and maintain pumping equipment.
 2. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
 3. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.
- V. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
1. Locate facilities where they will serve Project adequately or as directed by Architect.
 2. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- B. Temporary Utilities:
1. Engage appropriate local utility company to install temporary service.
- C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.
- E. Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest-control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Engage this pest-control service to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.

3.2 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by weather.
 - 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.
- B. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion. Permanent fire protection materials may be used, if required.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction and site 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 the property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Section 01770 - Closeout Procedures.

END OF SECTION

SECTION 01600

PRODUCT AND MATERIAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Administrative and procedural requirements for the following:
1. Product delivery, storage, and handling
 2. Manufacturers' standard warranties on products
 3. Product substitutions
 4. Comparable products.

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.
- B. Prior Approvals: Substitution requests made prior to receipt of bids.

1.3 SUBMITTALS

- A. Product List: Submit a list showing specified products as follows:
1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 3. Completed List: Within 20 days after date of Notice to Proceed, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 4. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement that products comply with the Contract Documents.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products to prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
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. Deliver fabrications in as large assemblies as practicable. Fabrications specified to be shop-primed or shop-finished shall be packaged or crated as required to preserve such priming or finish intact and free from abrasion.
5. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
6. Store products to allow for inspection and measurement of quantity or counting of units.
7. Store materials in a manner that will not cause obstructions or endanger Project structure. Store off sidewalks, roadways, and underground services.
8. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
9. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
10. Protect stored products from damage.
11. When a room in the Project is used as a shop or store room, the Contractor shall be responsible for all repairs, patching or cleaning necessary due to such use. Location of such storage space shall be subject to approval of the Architect.

1.5 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.
- B. Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that 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. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 3. Where products are accompanied by the term "as selected," Architect will make selection unless otherwise indicated.
 4. Where products are accompanied by the term "match approved sample," the sample to be matched is Architect's.
- B. Product Selection Procedures:
 1. Product: Where a single product and manufacturer is named, provide the product named.
 2. Manufacturer: Where a single manufacturer is listed, provide a product by the manufacturer that complies with requirements.
 3. Manufacturers: Where a list of manufacturers' names is provided, provide a product by one of the manufacturers listed that complies with requirements.

4. Basis-of-Design Products: Where Specifications indicate a specific product as "Basis-of-Design Product[s]" or "Specifications are based on" and also introduce or refer to a list of manufacturers' names, provide either the specified 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.

2.2 PRODUCT SUBSTITUTIONS

- A. Prior Approvals (Substitution requests during the bidding phase):
 1. Substitutions will be considered when written request has been submitted to the Architect for approval at least 10 days prior to the date for receipt of bids.
 2. Contractor shall request approval of such substitution on a form acceptable to Architect.
 3. Requests shall include documentation of compliance with requirements for conditions for Substitution Requests as specified herein.
 4. Form of Acceptance: Architect will set forth approval in writing.
- B. Substitutions (After Award of Contract):
 1. Substitution requests will be considered only under one or more of the following circumstances:
 - a. If the specified product is not available
 - b. Specified product or material cannot be provided within the Contract Time.
 - c. Request relates to an "or equal" clause.
 - d. 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.
 - e. Specified product or material cannot receive regulatory approval.
 - f. Specified product or material is compatible with other materials.
 - g. Specified product or material cannot be coordinated with other materials.
 - h. Specified product or material manufacturer cannot provide the specified warranty.
 2. Requests for substitutions shall be received by the Architect a minimum of 14 days prior to date Contractor is required to place an order for the product.
 3. Submit 3 copies of each request. Identify product, fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 4. Substitution Request Form: Section 01650 - Substitution Request Form (After the Bidding Phase) contained in the Project Manual.
 5. Requests shall include the following information:
 - a. Documentation of compliance with Conditions for Product Substitutions as specified herein.
 - b. Statement indicating why specified material or product cannot be provided. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - c. Coordination information, including a list of changes or modifications required to other parts of the Work that will be necessary to accommodate proposed substitution.
 - d. Detailed comparison of significant qualities of proposed substitution with those of the Work specified.
 - e. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - f. Samples, where applicable or requested by Architect.
 - g. List of similar installations in completed projects. Include names and addresses of the project, Architect and Owner.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

- i. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - j. Detailed comparison of Contractor's Construction Schedule using proposed substitution compared to specified products.
 - k. Cost information, including any changes in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents 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.
6. Architect's Action:
- a. If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution.
 - b. Architect will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - c. Form of Acceptance: Response to request for substitution..
- C. Conditions for Product Substitutions: 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:
- 1. Requested substitution does not require extensive revisions to the Contract Documents.
 - 2. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 3. Substitution request is fully documented and properly submitted.
 - 4. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - 5. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 6. Requested substitution is compatible with other portions of the Work.
 - 7. Requested substitution has been coordinated with other portions of the Work.
 - 8. Requested substitution provides specified warranty.
 - 9. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01650

SUBSTITUTION REQUEST - FORM
(After the Bidding Phase)

Project: Homestead Community Center
And Sales Office
To: _____
Re: _____

Substitution Request No: _____
From: _____
Date: _____
A/E Project Number: CCBG 0428
Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____
Installer: _____ Address: _____ Phone: _____
History: New product 2-5 years old 5-10 years old More than 10 years old
Differences between proposed substitution and specified product: _____

Point-by point comparative data attached – REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:
Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).
Proposed substitution changes Contract Time: No Yes [Add] [Deduct] _____ days.

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
 - Same warranty will be furnished for proposed substitution as for specified product.
 - Same maintenance service and source of replacement parts, as applicable, is available.
 - Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
 - Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
 - Proposed substitution does not affect dimensions and functional clearances.
 - Payment will be made for changes to building design, including A/E design, detailing, and construction costs by the substitution.
 - Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.
-

Submitted by: _____
Signed by: _____
Firm: _____
Address: _____
Telephone: _____
Attachments: _____

A/E's REVIEW AND ACTION

- Substitution approved – Make submittals in accordance with Specification Section 01330.
- Substitution approved as noted – Make submittals in accordance with Specification Section 01330.
- Substitution rejected – Use specified materials.
- Substitution Request received too late – Use specified materials.

Signed by: _____ Date: _____

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____

END OF FORM

SECTION 01700
EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: General procedural requirements governing execution of the Work including, but not limited to, the following:
1. Construction layout.
 2. Field engineering and surveying.
 3. General installation of products.
 4. Progress cleaning.
 5. Starting and adjusting.
 6. Protection of installed construction.
 7. Correction of the Work.

1.2 SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- C. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.
- D. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
1. Before construction, verify the location and points of connection of utility services.

- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- C. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 1. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

- E. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
- F. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- G. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 01730 - Cutting and Patching.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01730
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Procedural requirements for cutting and patching.

1.2 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
1. Necessity: Describe why cutting and patching cannot be avoided.
 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 3. Description of proposed Work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades which will execute Work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 7. Cost proposal, when applicable.
 8. Written permission of trades whose Work will be affected.
 9. Architects Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

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

- C. **Miscellaneous Elements:** Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Exterior curtain-wall construction.
 4. Equipment supports.
 5. Piping, ductwork, vessels, and equipment.
 6. Noise- and vibration-control elements and systems.
- D. **Visual Requirements:** Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.5 PAYMENT FOR COSTS

- A. Cost caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of Architect and Engineer to be paid by Contractor.
- B. Cost of Work done on written instructions of Architect, other than defective or nonconforming Work, will be paid by Owner on approval of written Change Order. Provide written cost proposals prior to proceeding with cutting and patching proposed by Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. **General:** Comply with requirements specified in other Sections of these Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect existing conditions of Work, including elements subject to movement or damage during cutting and patching, and excavating and backfilling. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. **Compatibility:** Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. **Temporary Support:** Provide temporary support of Work to be cut.
- B. **Protection:** Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. **Adjoining Areas:** Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes as shown on Drawings and as specified.
- C. Fit Work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces. Conform to fire code requirements for penetrations and maintain integrity of fire walls and ceilings.
- D. Restore Work which has been cut or removed. Install new products to provide completed Work in accordance with requirements of Contract Documents and as required to match surrounding areas and surfaces.
- E. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION

SECTION 01770
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. Inspection procedures.
 2. Project Record Documents.
 3. Operation and maintenance manuals.
 4. Emergency Manuals
 5. Warranties.
 6. Instruction of Owner's personnel (Demonstration and Training).
 7. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: The following items shall be completed prior to requesting inspection for determining date of Substantial Completion:
1. Prepare a list of items to be completed and corrected (punch list). Include the value of items on the list, and reasons why the Work is not complete.
 - a. Preparation: Submit 3 copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including areas disturbed by Contractor.
 - b. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 - c. Organize items applying to each space by major element.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

- B. Inspection: Submit a written request for inspection for Substantial Completion. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Prior to requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 01290 - Payment Procedures.
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 PROJECT RECORD DOCUMENTS

- A. General: Contractor shall maintain a complete and accurate record of changes or deviations from the Contract Documents and Shop Drawings, indicating the Work as actually installed. Record information in the appropriate locations on a record set of prints of the Drawings and Shop Drawings and a copy of the Specifications that are maintained solely for the purpose of this documentation. Keep this record set of Contract Documents and Shop Drawings at the project site for review by the Owner and Architect.
1. Do not use Project Record Documents for construction purposes.
 2. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
 3. The Individual or entity who obtains record data shall prepare Record Documents.
 4. Information contained in the record documents shall include, but not be limited to:
 - a. Actual installation where actual installation varies from original drawings
 - b. Modifications made by Addenda, Change Orders, Construction Change Directives and Architect's Supplemental Instructions which shall be transferred to the record documents.
 - c. Location of underground pipes, conduits, ducts, cables and similar work, dimensioned horizontally to permanent points of reference and located vertically by indicating depth of burial. Dimensions shall be accurate within ± 6 inches.
 - d. Location of plumbing piping, sprinkler piping, control valves, heating and air conditioning equipment, mechanical piping, ductwork, major conduit runs, power, control and alarm wiring, etc., dimensioned horizontally to permanent points of reference. Dimensions shall be accurate within 6 inches.
 - e. Modifications made to accommodate field conditions.

- f. Location and function of mechanical and electrical control devices and shut-off valves.
 - g. Final circuiting of electrical fixtures and equipment.
 - 1) Record and check the markup before enclosing concealed installations.
 - h. Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
- B. Record Prints:
- a. The Architect will provide the Contractor with a set of reproducible drawings, of the complete original bidding documents, at Contractor's expense. Seals and signatures of Registrants shall be completely removed and/or permanently obscured.
 - b. Mark record sets with erasable, red-colored pencil. Use additional colors as required to distinguish changes for different categories of the Work at the same location. Deletions shall be made by erasure or sepia eradicator only.
 - c. Prior to application for final payment, transfer all changes, information and notations made to the record prints to a reproducible set.
 - d. Organize final Record Prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Transparencies:
- 1. Following approval of Record Prints from Architect, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.
 - 2. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
 - 3. Refer instances of uncertainty to Architect for resolution.
 - 4. Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include complete set, identify Drawings included.
- D. Upon Substantial Completion of the Work, deliver the complete set of Record Documents including prints, reproducible set, Shop Drawings and annotated Specifications to the Architect for approval.
- E. Number of Copies:
- 1. Initial Submittal: Submit one set of corrected Record Transparencies and one set of marked-up Record Prints to Architect for approval.
 - 2. Final Submittal:
 - a. Marked-up Record Prints: One set.
 - b. Record Transparencies: One set.
 - c. Copies printed from Record Transparencies: 3 copies. Print each Drawing, whether or not changes and additional information were recorded.
- F. Identification: Provide the following information on each Drawing CAD file:
- 1. Project name.
 - 2. Date.
 - 3. Designation "PROJECT RECORD DRAWINGS."
 - 4. Name of Architect.
 - 5. Name of Contractor.
- G. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Where installation varies from that indicated, mark copy to indicate the actual product installation.
- 1. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

2. Note related Change Orders and Record Drawings.

H. Miscellaneous Record Submittals: Bind or file miscellaneous records with identification labels clearly visible.

1.5 OPERATION AND MAINTENANCE MANUALS

A. General: Assemble 2 copies of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data: Include complete operating sequence, control diagrams, description of method of operating machinery, machine serial numbers, factory order numbers, parts, tests, instruction books, suppliers phone numbers and addresses, individual equipment guarantees, parts and part numbers.
2. Maintenance Data: Include manufacturer's information, a list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds. Include lists of filter sizes for air handling equipment, indicating which unit filter if for and if filter is "washable" or "disposable".

B. Organization:

1. Organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system.
2. Include a title page and table of contents in each manual.

C. Format:

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

D. Provide manufacturer's operations and maintenance videotapes of each specific equipment item or system.

E. Upon substantial completion of the Project Work, submit one copy of the Maintenance Manual and Operating Instructions to the Architect for approval. Upon receipt of Notice of Approval, deliver the additional copy to the Owner.

1.6 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for type of emergency, emergency instructions, and emergency procedures. Include instructions and procedures for each system, subsystem, piece of equipment, and component.
- B. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- C. Emergency Procedures: Include instructions on stopping, shutdown instructions for each type of emergency, operating instructions for conditions outside normal operating limits, and required sequences for electric or electronic systems.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties upon request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Include and additional copy of each warranty in the operation and maintenance manuals.

1.8 OWNER'S MANUAL

- A. Prior to final payment, submit one hard-back, loose-leaf binder containing the following items, typed, indexed and labeled for ready reference:
 - 1. Subcontractors, major suppliers list with company's names, addresses and telephone numbers.
 - 2. Certifications.
 - 3. Affidavit from general and subcontractors on use of asbestos free materials.
 - 4. List of Extra Materials supplied to Owner, signed by Owner's representative.
 - 5. Other items required by the Specifications.

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 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment.
 - 1. Provide instructors experienced in operation and maintenance procedures.
 - 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 - 3. Schedule training with Owner, through Architect. Provide a minimum of 7 days' advance notice.
 - 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment type, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline.
 - 1. Include instruction for system design and operational philosophy, review of documentation, operations, adjustments, troubleshooting, maintenance, and repair.

3.2 FINAL CLEANING

- A. General: 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. 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 portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom-clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows, taking care not to scratch surfaces. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - j. Remove labels that are not permanent.

- k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to unusual operating conditions.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.
- E. Make building(s) ready for occupancy in every respect. Lay heavy building paper in main circulation areas to protect the floors until final inspection and acceptance.
- F. Existing improvements, inside or outside the property which are disturbed, damaged or destroyed by the Work under the Contract shall be restored to the condition in which they originally were, or to the satisfaction of the Architect.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating and backfilling for buildings and structures.
 - 3. Excavating and backfilling trenches.

1.2 DEFINITIONS

- A. Backfill and Fill: Satisfactory soil materials used to fill an excavation.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill. Also "Imported Fill".
- E. Drainage Course: Course supporting slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Uncontrolled Fill: Existing fill that was not properly placed, observed and tested. Also "Undocumented Fill".
- G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- H. Fill: Soil materials used to raise existing grades.
- I. Finished Grade: Floor level for interior footings, and the lowest adjacent grade (either floor level or outside grade) within 5'-0" of foundations for perimeter wall or exterior column footings.
- J. Native or natural soils: Undisturbed soils present at site in their natural state or conditions.
- K. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.
- L. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

- M. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- N. Satisfactory Soils: Approved by Geotechnical Engineer for use as structural fill. Also "Structural Fill" or "Engineered Fill".
- O. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of plastic warning tape.
- B. Material Test Reports: Submit directly to Architect from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.
 - 3. Test results shall clearly indicate:
 - a. Types of materials and composition.
 - b. Hardness
 - c. Compactability.
 - d. Presence of organic contaminants, whether or not below EPA action levels.
 - e. Presence of hazardous and/or regulated wastes and contaminants, whether or not below EPA action levels.
 - f. Suitability for proposed usage.
 - 4. Testing laboratory shall notify Architect of non-conforming fill material submittals.
- C. As-Built Drawings: Maintain previously recorded utilities and accurately record location of:
 - 1. Newly encountered utilities remaining.
 - 2. Rerouted utilities.
 - 3. New utilities by horizontal dimensions, elevations or inverts, and slope gradients.
 - 4. Submit in accordance with Section 01770 -Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- B. Regulatory Requirements: Comply with applicable Federal, State and local ordinances, including MAG Specifications, Arizona Highway Department Standard Specifications. Where geotechnical report, General Structural Notes, or notes on drawings state more restrictive requirements, the requirements of the geotechnical report, General Structural Notes, or notes on drawings shall govern.
- C. Observation of Geotechnical Engineer: Every phase of the earthwork shall be performed under observation and testing directed by the Geotechnical Engineer.

1.5 PROJECT CONDITIONS

- A. Unknown Utilities and Concealed Conditions:
1. Upon discovery of unknown utility or concealed conditions which are unrecorded on the Contract Documents, discontinue affected Work and notify Architect in writing.
 2. Should additional work be required to remove, maintain, re-route, extend or protect unknown utilities or other conditions, the Contractor will be paid for the Work in accordance with the provisions of the General Conditions.
- B. Geotechnical Investigation:
1. Geotechnical Investigation provided by the Owner for design of this Project was prepared by Construction Inspection and Testing Company, project number 57102.
 2. Neither the Owner or Architect guarantees the accuracy of the report nor the continuity of the soil conditions indicated at boring locations.
 3. Portions of the soil report incorporated, either by reprint or reference, into these Specifications are those which relate to the quality of materials and workmanship and become a part of the Contract Documents. Quantities of excavation and fill materials shall be as indicated on Drawings, or as required by actual conditions as depicted by the soil borings presented in the Geotechnical Investigation.
- C. Existing Conditions:
1. Bidders are expected to visit the site to form their own conclusions as to the character of the Work under this Section.
- D. Environmental Requirements: Place, spread or roll fill materials during favorable weather conditions. When the Work is interrupted by rain, do not resume fill operations until evidence is furnished which establishes that moisture content and density of the previously placed fill are as specified.
1. Surface drainage: Provide and maintain positive surface drainage during excavation. Prevent infiltration of water into utility or foundation excavations from whatever sources as may exist.
 2. Dust control: Comply with requirements of governing authorities. Use whatever means necessary to control dust on and near the Work and on and near off-site borrow, storage and spoil areas, if such dust is caused by the Contractor's operations during performance of the Work, or if resulting from the conditions in which the Contractor leaves the site. Thoroughly moisten surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other Work on the site.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soils: Free of rock or gravel larger than 6 inches in any dimension, debris, waste, frozen materials, vegetation, organic matter and other deleterious matter. Provide borrow material when on-site soils are not satisfactory. Onsite soils may be used as fill material provided they are compacted as specified.
- B. Imported Fill: Relatively non-expansive and predominantly granular material. Imported materials shall be approved by Geotechnical Engineer prior to importing.
- C. Backfill and Fill: Satisfactory soil materials.
- D. Pipe Bedding Fill: Granular material containing no pieces larger than 1-1/2 inches and free of broken concrete, broken pavement, wood or other deleterious material. Open graded rock shall not be used.

- E. Base Course Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

2.2 ACCESSORIES

- A. Warning Tape:
 - 1. Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility.
 - 2. Provide detectable warning tape with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 2'-6" deep for non-metallic utility pipes, conduit or other underground services outside of building line.
 - 3. Tape Colors: Provide tape colors to utilities as follows:
 - a. Red: Electric.
 - b. Yellow: Gas, oil, steam, and dangerous materials.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems.
 - e. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Strip and remove structural remnants, unsatisfactory soil materials, obstructions vegetation, debris, loose soil, etc., from the building site. Thoroughly clean and widen depressions to accommodate compaction equipment.
- C. Remove material within the pit located in the southwest area of the site. Removals must extend to firm native undisturbed soils.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- E. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- F. Verify on-site materials intended for reuse are acceptable to Geotechnical Engineer.
- G. Identify above and below grade utilities.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXCAVATION

- A. General:
 - 1. Drawings show predetermined elevations or depths for bottoms of footings. Should additional depth of excavation be necessary, the Contractor will be paid for the Work in accordance with the provisions of the General Conditions.
 - 2. Protect excavations from cave-ins and from loose soil and matter from falling into excavation.
 - 3. Fill unauthorized excavation or excavations below depth indicated under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation.
- B. Overexcavation: Overexcavate to a minimum depth of 3.0 foot below existing grade or to 6 inches below bottom of footing elevations, whichever is deeper. Over-excavation shall extend across the entire building pad and to a minimum lateral distance of five feet beyond foundation edges.
- C. Explosives: The use of explosives is not permitted.
- D. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions.
 - 1. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 2. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- E. Tolerances: Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Pile Foundations: Stop excavations from 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
- F. Walks and Pavement: Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

- G. Utility Trenches: Excavate trenches to indicated gradients, lines, depths, and elevations.
1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
 2. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 - a. Maximum Clearance: 12 inches on each side of pipe or conduit.
 3. Width:
 - a. Trench as required to provide the elevations shown on the Drawings, or, if not indicated or specified, trench to sufficient depth to give a minimum of 18" of fill above the top of the pipe, measured from the adjacent finished grade.
 - b. Where the bottom of excavation is found to be soft and cannot support the pipe, the depth shall be extended until solid bearing is reached. Backfill to pipe foundation grade with granular material or earthfill and thoroughly compact to assure a firm foundation for the pipe.
 - c. Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
 - d. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.4 SUBGRADE

- A. Prepare subgrade to levels as indicated on Drawings and as required to receive base and subbase materials.
- B. Notify Geotechnical Engineer and Architect when excavations have reached required subgrade. Exposed soils in excavations shall be inspected by Geotechnical Engineer.
- C. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- D. Scarify, moisten and compact exposed subgrade in the excavations to a minimum depth of 8 inches. Fill material needed to raise and level the building site shall be Fill soil as specified herein.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.5 STORAGE OF SOIL MATERIALS

- A. Stockpile borrows soil materials and excavated satisfactory soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.6 BACKFILL - GENERAL

- A. Place and compact backfill in excavations promptly, after the following items have been completed:
 1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Subgrades shall be free of mud, frost, snow, or ice.

3.7 BACKFILL - UTILITY TRENCHES

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with concrete to elevation of bottom of footings.
- C. Provide 4-inch-thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
- D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- E. Coordinate backfilling with utilities testing.
- F. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- G. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.8 FILL PLACEMENT AND COMPACTION

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place backfill and fill materials in layers not more than 6 inches in loose depth.
- C. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- D. During construction and prior to placement, moisture contents should be controlled as follows, in accordance with ASTM D-698:
 1. Backfill Optimum to +4 percent.
 2. Native Moderately Low to Moderate Swell Soils:
 - a. Below Foundations/Floors: Optimum to +4 percent.
 - b. Fills at Depth 5 to 10 Feet Below Finish Grade: Optimum -2 to optimum +2 percent.

- c. Fills at Depths 10 Feet or Greater Below Finish Grade: Optimum -2 to optimum +2 percent.
- 3. Native Low Swell and Approved Import Low Swell Soils:
 - a. Below Foundations/Floors: Optimum -2 to optimum +2 percent.
 - b. Fills at Depth 5 to 10 Feet Below Finish Grade: Optimum -2 to optimum +2 percent.
 - c. Fills at Depths 10 Feet or Greater Below Finish Grade: Optimum -2 to optimum +2 percent.
- 4. A field density test should be taken for each 12 inches of compacted fill or at the discretion of the inspecting engineer.

E. Compaction of backfill, subgrade soil, subbase fill, and base course materials shall be accomplished to the following density criteria in accordance with ASTM D698:

Material	Percent Compaction (ASTM D698)
1. Backfill	85-90 percent.
2. Landscape and Yard areas:	85 percent
3. Native Moderately Low to Moderate Swell Soils:	
a. Below Foundations/Floors:	90-95 percent.
b. Fills at Depth 5 to 10 Feet Below Finish Grade:	98 percent minimum
c. Fills at Depths 10 Feet or Greater Below Finish Grade:	100 percent minimum
4. Native Low Swell and Approved Import Low Swell Soils:	
a. Below Foundations/Floors:	95 percent minimum
b. Fills at Depth 5 to 10 Feet Below Finish Grade:	98 percent minimum
c. Fills at Depths 10 Feet or Greater Below Finish Grade:	100 percent minimum

3.9 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.12 FINISH GRADING

- A. After construction and final clean-up of exterior, and removal of debris, grade building site to slopes and elevations directed.
- B. Leave graded areas raked smooth.

- C. Remove excess material from the site.
- D. At areas designated as lawn, place topsoil to a depth of 2 inches and grade to within a tolerance of 0.10 foot to required elevations.
- E. At areas designated as planting or planters, place topsoil to a depth of 12 inches to required elevations.

3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet or less of wall length, but no fewer than two tests.
 - 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet or less of trench length, but no fewer than two tests.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.14 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 02360
SOIL TREATMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Soil treatment for subterranean termite protection.
 2. Treatment of site and areas as indicated to remove vegetation growth.

1.2 SUBMITTALS

- A. Product Data: Treatments and application instructions, including EPA-Registered Label and State approval.
- B. Product Certificates: For termite control products, signed by product manufacturer.
- C. Qualification Data: For Installer of termite control products
- D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:
1. Date and time of application.
 2. Moisture content of soil before application.
 3. Brand name and manufacturer of termiticide.
 4. Quantity of undiluted termiticide used.
 5. Dilutions, methods, volumes, and rates of application used.
 6. Areas of application.
 7. Water source for application.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and shall have a minimum of 5 years documented experience with projects of similar scope and nature.
- B. Regulatory Requirements: Formulate and apply termiticides, and label with a Federal registration number, to comply with EPA regulations and authorities having jurisdiction.
- C. Source Limitations: Obtain termite control products from a single manufacturer for each product.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01310 - Project Management and Coordination to schedule application of termiticide products.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply treatment to soil that is water saturated or frozen or while precipitation is occurring. Comply with EPA-Registered Label requirements and requirements of authorities having jurisdiction.

1.5 COORDINATION

- A. Coordinate soil treatment application with excavating, filling, and grading and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs, before construction.

1.6 WARRANTY

- A. Warranty: Provide written warranty, signed by applicator and Contractor certifying that soil treatment will work as specified herein, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
 - 1. Warranty Period: Five years from date of Substantial Completion.
 - 2. Draft warranty in favor of Owner, successors or assigns.
 - a. Pre-printed FHA or VA guarantee forms shall not be acceptable.
 - b. The Owner and the applicator reserve the option to renew termite protection on an annual basis after the expiration of the warranty.
- B. Upon evidence of subterranean termite activity within warranty period, re-treat area to stop infestation of affected areas and repair damage to building and contents at no cost to Owner.
 - 1. Re-treatment under warranty sufficient to prevent termites from attacking building or its contents during remainder of initial warranty period, plus one additional year for each time re-treatment under warranty is required.
 - 2. Complete re-treatment of the building shall be as specified herein and shall be rendered upon the third recurrence of subterranean termites in the same structure within 5-year period from the date of project acceptance.
 - 3. Damage caused by infestations and by re-treatment shall be repaired at no cost to the Owner.
- C. Upon evidence of vegetation growth, re-treat area at no cost to Owner.

1.7 MAINTENANCE SERVICE

- A. Continuing Service: Beginning at Substantial Completion, provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, and terms for agreement period; and terms for future renewal options.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dagnet FSR (Permethrin), FMC Corporation.
 - b. Torpedo (Permethrin); ICI Americas, Inc.
 - c. Biflex TC (3rd generation synthetic pyrethroid), FMC Corporation
 - d. Termidor; Aventis Environmental Science USA LP
 - e. Premise 75.; Bayer Corporation

- B. Vegetation Treatment:
 - 1. Chemical Control: Roundup or Doomsday.
 - 2. Pre-Emergent: Surflan, Dacthal or approved equal.
- C. Mix solutions in accordance with Manufacturer's directions to highest concentration allowable by label and local regulations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. With Applicator present, examine substrates, areas, and conditions, for compliance with requirements for moisture content of the soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of soil treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings.
 - 1. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
- C. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.
- B. Termicide: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute the treatment evenly.
 - 1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - 2. Foundations: Adjacent soil including soil along entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers, piers, and chimney bases; and along entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
 - 3. Masonry: Treat voids.
 - 4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.

5. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

C. Vegetation Control:

1. Apply chemical to on-site landscape areas and landscaped portions of public street right-of-ways or site.
2. Chemical Control: Prior to planting operations, provide 2 applications over unwanted vegetation.
3. Pre-emergent: Post landscape planting operations. Comply with manufacturer's label for application and protection of existing landscape planting.

- D. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

- E. Post warning signs in areas of application.

- F. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.4 FIELD QUALITY CONTROL

- A. Tests: Chemical analysis tests shall be made of materials used on the basis of one test for each 10,000 square feet of treated area. Samples and test may be taken of both concentrates and the dilute materials as being applied.

END OF SECTION

SECTION 02740
ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Hot-mix asphalt paving.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
- B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- C. Qualification Data: For manufacturer.
- D. Material Test Reports: For each paving material.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
1. Manufacturer shall be a paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of the state in which Project is located.
- B. Regulatory Requirements: Comply with Maricopa Association of Governments (MAG) Specifications except as specified otherwise.
- C. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Project 01310 - Project Management and Coordination. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
 2. Review condition of subgrade and preparatory work.
 3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Conform to applicable requirements of MAG Section 321.
1. Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:
 - a. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
 - b. Slurry Coat: Comply with weather limitations of ASTM D 3910.
 - c. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.

- d. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. Aggregate Base Course:
 - 1. Base materials: Conform to MAG Sections 310 and 702 and requirements specified herein. Material to be crushed rock product with a plasticity index not exceeding 5 and comply with grading requirements shown in Table 702.
 - 2. Aggregate: Clean and free of organic matter and of such a nature that it can be compacted to a dense and firm layer capable of supporting loaded trucks and self-propelled pavers without rutting.
 - 3. Deliver aggregate to site in thoroughly blended condition and handle in manner to prevent excessive segregation. Do not mix underlying soil or subbase with aggregate base material. Do not mix underlying soil or subbase with aggregate base material.

2.2 ASPHALT MATERIALS

- A. Asphaltic Concrete Paving: Comply with MAG Section 710.
 - 1. When test procedures determine aggregate is subject to stripping, add dry hydrated lime conforming to requirements of ASTM C207, Type N; portland cement conforming to Section 725 of MAG Specifications; or other approved anti-strip agent.
 - 2. Composition and Grading: Comply with MAG Section 710.3. Aggregates and mix to be incorporated into Work shall show loss in L.A. Rattler (ASTM C131) (after 500 revolutions) of 40% max.
- B. Prime Coat: Asphalt emulsion prime complying with ADOT requirements.
- C. Water: Potable.

2.3 EQUIPMENT

- A. Spreading and Finishing Equipment: Comply with MAG Section 321.5.2.
 - 1. Equipment to be of good condition and capable of performing Work specified in satisfactory manner.
 - 2. Start finish rolling after pavement has cooled sufficiently to permit removal of roller marks and continue in whatever direction is necessary to produce a pavement surface free of indentations. See MAG Section 321.
 - 3. Leveling Course: Comply with MAG Section 321.5.3.

2.4 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:
 - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

- B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
 - 1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.
- B. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure for 72 hours minimum.
 - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 - 2. Protect primed substrate from damage until ready to receive paving.

3.3 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
 - 2. Place hot-mix asphalt surface course in single lift.
 - 3. Spread mix at minimum temperature of 250 deg F.
 - 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
 - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.
- D. Thickness: As recommended by Civil Engineer.

3.4 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 - 3. Offset transverse joints, in successive courses, a minimum of 24 inches.

4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
 2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

- A. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 1. Base Course: 1/4 inch.
 2. Surface Course: 1/8 inch.
 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.
 - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.8 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow excavated materials to accumulate on-site.

END OF SECTION

SECTION 02765
PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Traffic marking and striping for pavement and curbs.

1.2 SUBMITTALS

- A. Product Data: Submit Manufacturer's data for paint products.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Traffic Surface Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, conforming to FS TT-P-1952.
1. Subject to conformance with specifications, provide one of following products:
 - a. Dunn-Edwards: Vin-L-Stripe W801 Series.
 - b. Sherwin-Williams: Acrylic Waterborne Traffic Marking Paint.
 - c. ICI Dulux: 4800 Waterborne Acrylic Traffic Marking Paint.
 - d. Frazee: 506 Traffic Line Paint-100 percent acrylic.
- B. Colors:
1. Stall Striping and Traffic Markings: Traffic White.
 2. Handicap Markings: White on blue background.
 3. Fire Lanes: Red

PART 3 - PRODUCTS

3.1 EXAMINATION

- A. Verify asphalt has aged a minimum number of days as recommended by paint manufacturer.
- B. Prepare chalk layout and obtain Architect's approval prior to start of marking and striping.

3.2 PREPARATION

- A. Thoroughly clean surfaces of substances which may inhibit bonding.

3.3 APPLICATION

- A. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges.
- B. Correct errors by sandblasting.
- C. Apply at rates required to provide manufacturer's recommended dry film thickness. Apply two coat minimum or more if required to obtain complete opacity.

- D. Stall Divisions: Provide between standard size parking stalls, a single 4 inch wide stripe, stall width as shown on Drawings
- E. Arrows and Pavement Signs: Paint directional arrows with stencils or other approved method. Strokes of letters, islands and "No Parking" areas to have 3 inch wide strips.
- F. Handicap Stalls: Provide symbol and other markings as indicated on Drawings and as required by code.
- G. Fire Lanes: Paint curbs as required.

3.4 PROTECTION

- A. Protect completed Work until dry.

END OF SECTION

SECTION 02770

CONCRETE PAVING, CURBS AND DRIVEWAY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Cement concrete pavement for the following applications:
1. Curbs and gutters.
 2. Walkways.
 3. Aprons.

1.2 SUBMITTALS

- A. Product Data: For each manufactured material and product indicated.
- B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material certificates. Signed by manufacturers certifying that materials comply with requirements:

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.
- C. Regulatory Requirements: Comply with applicable Federal, State and local ordinances, including MAG specifications. Where geotechnical report, General Structural Notes, or notes on drawings state more restrictive requirements, the requirements of the geotechnical report, General Structural Notes, or notes on drawings shall govern.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Reinforcement:
1. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
 2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.
 3. Plain Steel Wire: ASTM A 82, as drawn.
 4. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening steel reinforcement. Manufacture bar supports according to CRSI's "Manual of Standard Practice."
- B. Concrete Materials:
1. Concrete for Curbs, Gutters and Sidewalks: Class B, complying with applicable requirements of MAG Section 725.

2. Concrete for Drives: Comply with Section 1006 of the ADOT Standard Specifications and Soils Report.
- C. Expansion Joint Filler: MAG Section 729.
- D. Epoxy Resin: Sta-Crete Epoxy Resin No. 15-J or 20.
- E. Curing Compound: ASTM C309, Type 1, Class B; acrylic type.
- F. Coloring Agent: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
 1. Color: As Selected by Architect. ?

2.2 CONCRETE MIXES AND MIXING

- A. Concrete Mixes: Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, with the following properties:
 1. Compressive Strength (28 Days): 3500 psi.
 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 3. Slump Limit: 4 inches.
 4. Air Content: 4.5 to 7.5 percent.
- B. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.
- C. Project-Site Mixing: Comply with requirements and measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
- D. Coloring Agent: Add coloring agent to mix according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Cut existing pavements and concrete joined by new construction in accordance with MAG Sections 336 and 350.
 1. The removal of existing improvements shall be conducted in such a manner as not to injure utilities or any portion of the improvement that is to remain in place.
 2. Sidewalks shall be removed to a distance required to maintain a maximum slope for the replaced portion of sidewalk, for one inch per foot.
 3. Portland cement concrete pavements, curbs and gutters and sidewalks designated on the plans for removal shall be saw-cut at match lines, and removed.
 4. Removal of trees, stumps, irrigation structures, storm water inlets, headwalls and other items in the right-of-way shall be as directed by Architect.
 5. Backfill and compaction of all excavated areas shall be compacted to the densities as prescribed in Section 02300 - Earthwork.
 6. All surplus materials shall be immediately hauled from the jobsite and disposed of in a legal manner.

7. Pavement Widening or Extensions: Existing pavements which are to be matched by pavement widening or pavement extension shall be trimmed to a neat true line with straight vertical edged free from irregularities with a saw specifically designed for this purpose. The minimum depth of cut shall be 1 1/2 inches or D/4, whichever is greater.
- a. The existing pavement shall be cut and trimmed after placement of required ABC and just prior to placement of asphalt concrete for pavement widening or extension, and the trimmed edges shall be painted with a light coating of asphalt cement or emulsified asphalt immediately prior to constructing the new abutting asphalt concrete pavements. No extra payment shall be provided for these items and all costs incurred in performing this work shall be incidental to the widening or pavement extension.
 - b. The exact point of matching, termination, and overlay may be adjusted in the field, if necessary, by the Owner's Representative.
- B. Construct subgrade and compacted true to grades and lines shown on Drawings and as specified in MAG Section 301.
- C. Material displaced during construction shall not be placed on base or surfacing material already in place on roadway. Do not place excavated material in manner as to interfere with access to property or traffic flow in street.
- D. Remove concrete sidewalks and driveways which are necessarily disturbed by construction to a distance required to maintain a slope as indicated by Standard Details or not to exceed one inch per foot where sidewalks are concerned.

3.2 INSTALLATION

- A. Forms: Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations.
- B. Reinforcement: Accurately position and support reinforcement, and secure against displacement. Set wire ties with ends directed into concrete.
1. Install welded wire fabric in lengths as long as practicable; lap at least one full mesh, and lace splices with wire.
- C. Joints: Locate and install construction, isolation, contraction, and expansion joints as indicated.
- D. Concrete Placement: Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete. Place concrete in a continuous operation within planned joints or sections.
1. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
 2. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping according to recommendations in ACI 309R.
 3. Screed and initial-float concrete surfaces with darby or bull float before excess moisture or bleed water appears on the surface.
 4. Protect concrete from cold or hot weather during mixing, placing, and curing.
- E. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

- F. Evaporation Retarder: Apply to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- G. Pavement Tolerances: Comply with tolerances in ACI 330.1, "Specification for Plain Concrete Parking Lots."

3.3 FINISHES AND CURING

- A. Finishing and Curing:
 - 1. Comply with MAG Section 505.
 - 2. Spray extruded curbs with curing agent sealer immediately after placing to achieve a surface comparable to a uniform broom finish. Take care in extruding radiuses and corners to prevent cracking and breaking of concrete curbing.
 - 3. Thoroughly fill, bond, and finish breaks or cracks to match remaining installation in manner approved by Architect.
 - 4. Curbing found unacceptable by Architect to be replaced at Contractor's expense.

3.4 FIELD QUALITY CONTROL

- A. Testing:
 - 1. Test face, top, back and flow line of curb and gutter with a 10 foot straightedge or curved template, longitudinally along surface.
 - 2. Correct deviations in excess of 1/4 inch.
 - 3. Test surface of concrete sidewalks with a 5 foot straight edge. Correct deviations in excess of 1/8 inch.
 - 4. Gutters:
 - a. When required by Architect, water test gutters having a slope of 0.8 foot per 100 feet or less, and where unusual or special conditions indicate gutter may not drain satisfactorily.
 - b. Water testing consists of establishing flow in length of gutter to be tested by supplying water from a hydrant, tank truck or other source.
 - c. One hour after supply of water is shut off, inspect gutter for evidence of ponding or improper shape.
 - d. In the event water is found ponded in gutter to a depth greater than 1/2 inch, or on the adjacent pavement, correct defect or defects in a manner acceptable to Architect.
 - 5. Remove and replace sections of Work deficient in depth or not conforming to Drawings or Specifications.
- B. Concrete Tests: As specified in Section 03300 – Cast-In-Place Concrete

3.5 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.
- B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.
- C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

SECTION 02790

TENNIS AND PICKLEBALL COURTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Post-Tensioned concrete slab.
 2. Court surface
 3. Tennis equipment
 4. Fencing.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
1. If applicable, include assembly, disassembly, and storage instructions for removable equipment.
- B. Shop Drawings: For equipment. Include plans, elevations, sections, details, attachments to other work/
- C. Coordination Drawings: Court layout plans, drawn to scale, and coordinating floor inserts.
- D. Product Certificates: For each type of gymnasium equipment, signed by product manufacturer.
- E. Qualification Data: For Installer.
- F. Operation and Maintenance Data: For gymnasium equipment to include in emergency, operation, and maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Source Limitations: Obtain each type of gymnasium equipment through one source from a single manufacturer.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install gymnasium equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Verify position and elevation of floor inserts and layout for gymnasium equipment.

1.5 COORDINATION

- A. Coordinate installation of floor inserts with court layout and game lines and markers on finish flooring.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of gymnasium equipment that fail in materials or workmanship within specified warranty period.
1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. General: Slabs shall be designed using acceptable engineering practices in accordance with the American Concrete Institute Building Code Requirements for reinforced concretes and the Post-Tensioning Institute's Tentative Specifications for Post-Tensioning Materials. The soil condition and plasticity index of the court site is to be considered in determining strand spacing and beam requirements.
- B. Cement Cement shall conform to one of the Standard Specifications for Portland Cement, ASTM C-150 or Specification for Blending Hydraulic Cements, ASTM C-595, excluding slag cements types S and SA.
- C. Aggregate: Aggregate shall conform to Standard Specifications for Concrete Aggregates ASTM C-33. For concrete work that is 5" thick the nominal size of the coarse aggregate shall not exceed one and one half inches (1-1/2").
1. Thickness of Concrete: 5 inches.
- D. Post-Tensioning: Post-tensioning materials shall consist 1/2-inch diameter, seven-wire stress-relieved strands, conforming to ASTM A-416 with an ultimate strength of 270 KSI. Strands shall be coated with a permanent rust preventative lubricant wrapped with plastic sheathing. If strand sheathing is damaged or removed, it is to be repaired by taping. A maximum of 6" exposed strand is permitted at the anchor. End anchorage devices will conform to PTI Specifications. All dead end anchorages must be power-seated. All strands are to be supported on chairs and tied at all intersections or securely supported in beams to prevent vertical and horizontal movement during concrete placement. Concrete must be well consolidated, especially in the vicinity of strand anchorages. 1/2" diameter strands shall be anchored at 28.9 KIPS, but may be initially stressed 33 KIPS. A 9" diameter centered on the strand axis by a 36" length shall be allowed for stressing equipment clearance. The stressing process generates tremendous pressures, and extreme care should be taken to prevent injury from operator error or from failure of equipment or materials.
- E. Joints:
1. Single courts shall be poured monolithic.
 2. Double courts shall have an expansion joint between each court.
 3. Multiple court banks should have an expansion joint between every two courts and where this occurs the cables will be 'dead ended' on both sides.
- F. Concrete Proportioning and Mixing: The concrete shall have a compressive strength of not less than 4000 p.s.i. after 28 days. Ready-Mix concrete shall be mixed and delivered in accordance with ASTM C-94 Specification for Ready-Mix Concrete with a 4-1/2 inch maximum slump.

2.2 COURT MATERIALS

- A. Tennis Equipment:
1. Tennis Net Posts: 3 inch o.d., 11-gauge steel pipe, galvanized with baked on powder coating.

2. Gears:
 - a. Self locking gear mechanism to prevent recoil during winding
 - b. Case hardened to prevent jamming
 3. Handle: Removable, chrome plated.
 4. Caps and gear housings are of cast aluminum alloy
 5. Net Tie-Down Anchors: Tube-type.
 6. Tennis Nets: 3.5 braided polyethylene netting that provides 325 lb. break strength. Fiberglass side-pocket dowels and center net strap are included.
- B. Footings: Post footings shall use 3000 p.s.i. concrete poured monolithic with the tennis courts.
1. Diameter and Depth: As indicated on Drawings.
- C. Chainlink Fencing
1. Chainlink Fabric: No. 11 gauge galvanized wire, extruded vinyl coating with a No. 9 gauge finish, 1-3/4" mesh, and green color as approved by Landscape Architect.
 2. End, Corner and Gate Posts: 2-7/8" O.D. SS 40 wgt. pipe
 3. Line Posts: 2-3/8" O.D. SS 40 wgt. pipe
 4. Top and Bottom Rail: 1-5/8" O.D. .065 wall pipe
 5. Gates Frames: 1-7/8" O.D. SS 20 wgt. pipe
 6. Fittings: Pressed steel galvanized
 7. Tension Wire: No. 7 gauge coil spring
 8. Concrete: 2500 p.s.i.
 9. Post and Framework Finish: Epoxy primer/urethane paint finish, green as approved by Landscape Architect.
- D. Fence Screen: 28 oz. vinyl inserts double sewn to 1 1/2 inches wide with #2 brass grommets spaced on 18 inches intervals.
1. Color: Dark Green. ?
- E. Pickleball Equipment: Provided by Owner.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Site Preparation: All excavating, filling, compacting, grading and leveling work required hereunder shall be performed so that the finished court surface slopes one inch for each ten feet on a true plane from end to end as shown on plans.
- B. Sub-grade and Base Preparation:
1. Sub-grade to be prepared as approved by court surfacing manufacturer to proper slope and compacted per soil engineering report.
 2. Base Course - Install 4 inches of ABC over court area and compact to 95% density.
- C. Concrete Placing and Finishing:
- D. At least a full half-court shall be placed in one continuous operation without intervening joints of any kind. Uninterrupted concrete placing operations without intervening joints shall be limited to one full court with continuous reinforcement. Concrete shall be spread, consolidated, screeded, bull-floated and finished in accordance with Section 7.2 of ACT Standard 302, Recommended Practice for Concrete Floor and Slab Construction. When concrete is sufficiently set to withstand foot pressure with only about 1/4 inch indentation and the water sheen has left the surface, the slab shall be uniformly finished by power-floating and trowelling. The final finish texture shall be finish concrete with a light broom finish. Broom slab in one direction only (cross ways to court play). Steel trowel finish is not permitted.

- E. Surface Tolerances: The concrete surface shall be finished so that the tolerance is 1/8" measured as the departure from the testing edge of a 10' straightedge held parallel to and in contact with the surface.
- F. Curing: Immediately after finishing, the concrete shall be kept continuously moist for 7 days by covering with polyethylene film or waterproof curing paper, or by sprinkling or ponding. Curing compounds should not be utilized. Curing time shall be in accordance with surfacing system manufacturer's recommendations.

3.2 INSTALLATION

- A. General: Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

3.3 FENCING

- A. Post Setting: Hand-excavate holes for post foundations in firm, undisturbed or compacted soil.
 - 1. Concrete Footings: Place concrete around posts and vibrate or tamp for consolidation. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.
- B. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567.
- C. Line Posts: Space line posts uniformly at 10 feet o.c maximum.
- D. Intermediate Rails: Install in one piece at as indicated, spanning between posts, using fittings, special offset fittings, and accessories.
- E. Bottom Rails: Install, spanning between posts, using fittings and accessories.
- F. Chain-Link Fabric: Securely attach fabric to enclosing framework.
- G. Tie Wires: Attach wire to chain-link fabric per ASTM F 626. Tie fabric to line posts at maximum interval of 12 inches o.c. and to braces at maximum interval of 24 inches o.c.
- H. Install wind screen in accordance with manufacturer's instructions and as indicated on Drawings.

3.4 CLEANING

- A. Remove all containers, surplus materials and debris upon completion of work leaving the site in a clean, orderly condition that is acceptable to the owner. Gates shall be secured and all containers shall be disposed of in accordance with Local, State and Federal regulations.

END OF SECTION

SECTION 02822
SITE FENCING AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Site fencing
 2. Swinging gates.

1.2 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings showing layouts, dimensions, construction details and installation, including fastening devices.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide commercial quality steel strip, degreased and hot dipped zinc coated on interior and exterior surfaces. Basic shapes shall be cold rolled and electrically welded with welded areas protected by a zinc rich paint to prevent corrosion.
- B. Steel: ASTM A36, hot-rolled sections for bars, angles, channels and other miscellaneous steel.
- C. Steel Pipe: ASTM A53.
- D. Tube: ASTM A500, Grade B.
- E. Anchor and Expansion Bolts: ASTM A307 anchor bolts, unless otherwise noted. Expansion bolts to have I.C.B.O. rating for material into which the installation takes place. Furnish anchor and expansion bolts with steel washers.
- F. Iron Castings:
1. Malleable-Iron Castings: ASTM A 47, Grade 32510.
 2. Gray-Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
- G. Primer: 2-component, moisture-cured zinc-rich primer conforming to SSPC-PS12.01.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Corothane I Galvapac B65G10/B69D210; Sherwin Williams
 - b. Theme-Zinc 90-97; Theme Company, Inc.
- H. Paint: As specified in Section 09900 – Painting.
- I. Gates:
1. Swinging Gates:
 - a. Hinges: Non-lift off type, offset to allow 180 degree gate opening, heavy duty galvanized steel butt hinges sized as required for weight of gate. Weld hinges to frame.
 - b. Latch: Clamp-on gravity system that is self latching with padlocking capabilities. Verify latch system with Architect prior to commencing work.

2.2 FABRICATION

- A. Shop welded by Arc-gas shield weld for smooth, clean, slag-free welds. Grind welds smooth. Completely prime and paint. Posts, pickets and rails sizes and shapes shall be as shown on the Drawings.
- B. Fences and Gates: Fabricate in configurations indicated on Drawings. Fabricate with continuously welded joints, and smooth exposed edges.
- C. Insulate contact joints between dissimilar materials to prevent electrolytic or corrosive action.

2.3 SHOP FINISHING

- A. Priming:
 - 1. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Shop prime steel surfaces, except the following:
 - a. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - b. Surfaces to be field welded.
 - c. Galvanized surfaces.
 - 2. Surface Preparation: Remove loose rust, loose mill scale, and spatter, slag, or flux deposits before shop coat of paint is applied. Remove oil, grease and similar contaminants in accordance with SSPC SP-6.
 - 3. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and to provide a uniform dry film thickness required by manufacturer. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 4. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 5. Apply 2 coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
 - 6. Paint erection marks on painted surfaces. Touch-up surfaces where welding, grinding of welds, joints, etc. are done in the field.
 - 7. Paint shall be thoroughly dry before members are handled.
 - 8. Surfaces shall receive paint finish as specified in Section 09900 – Painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor posts in concrete footings or to masonry wall as shown on the Drawings.
- B. Securely anchor gates and erect plumb, level, and true, with smooth operating hardware.
- C. All gate hardware shall be installed with vandal resistant or concealed fasteners.
- D. Touch up abrasions, bolts, rivets, welds and other spots after erection with the same type of paint as used for shop coat.

3.2 CLEANING

- A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 02841

WHEEL STOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Precast Concrete parking bumpers.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Precast Parking Bumpers: Comply with MAG Standard Detail 150, Type B-3, and MAG Uniform Standard Specifications Section 410
- B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and appropriate grade.
- C. Dowels: Galvanized steel, 3/4-inch diameter, 10-inch minimum length.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install bumpers at locations indicated on Drawings.
- B. Concrete Pavement Areas: Install each unit with epoxy adhesive. Use adhesive in accordance with manufacturer's printed instructions.
- C. Asphalt Pavement Areas: Securely attach parking bumpers into pavement with not less than two galvanized steel dowels embedded at one-quarter to one-third points. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of wheel stop.

END OF SECTION

SECTION 02870
SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Bicycle racks.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.
- B. Sample: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Size: Not less than 6-inch- long linear components.
- C. Maintenance Data: For site and street furnishings to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 BICYCLE RACKS

- A. Bike Rack:
1. Basis of Design: U/2 as manufactured by Cycle-Safe.
2. Finish: Manufacturer's standard rubberized coating.
3. Installation Method: Set into concrete.
- B. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality. Provide as required for site and street furnishings' assembly, mounting, and secure attachment.
- C. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- D. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Complete field assembly of site and street furnishings, where required.
- B. Unless otherwise indicated, install site and street furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.
- D. Install using one of the following techniques as appropriate for conditions and as approved by Architect:
 - 1. Post Setting: Set cast-in posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
 - 2. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site and street furnishings and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

3.3 CLEANING

- A. After completing site and street furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION

SECTION 02890
TRAFFIC CONTROL SIGNS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Directional traffic signage as indicated on Drawings and as required by local jurisdictions.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Include manufacturer's written instructions for maintaining and cleaning sign surfaces.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metals: New stock, free from defects impairing strength, durability or appearance.
1. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of alloy 6063-T5.
 2. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500, Grade B. Paint with acrylic polyurethane enamel.
- B. Plastics: New stock, free from defects and of the best quality available.
- C. Paints: Type made for the surface material on which it is to be applied and recommended by the manufacturer of the paint. No paint that will fade, discolor or delaminate as a result of proximity to UV light sources or heat therefrom shall be used.

2.2 ACCESSORIES

- A. Fasteners: Use concealed fasteners fabricated from metals that are noncorrosive to sign material and mounting surface.
- B. Anchors and Inserts: Use stainless-steel or hot-dip galvanized anchors and inserts. Use torque-controlled expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete.
- C. Concrete for Postholes: Comply with requirements in Section 03300 - Cast-in-Place Concrete for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 2500 psi, unless otherwise indicated.

2.3 FABRICATION

- A. Fabricate in accordance with City of Maricopa Standard Details and as indicated on Drawings.

2.4 FINISHING

- A. Shop Finishing:
 - 1. Paint shall be thoroughly and evenly applied and shall be well worked into corners and joints and shall not have edge or joint buildups.
 - 2. Paint shall be evenly applied and without pinholes, scratches, orange peeling, application marks, etc.
 - 3. Workmanship in connection with finishes shall conform to the standard of the trade. Prime coats or other surface pre-treatments, where recommended by the manufacturer for paints, shall be included in the work.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavation: In firm, undisturbed or compacted soil, drill or (using a post-hole digger) hand-excavate holes for posts to diameters and spacing indicated.
- B. Center and align posts in holes 3 inches above bottom of excavation.
 - 1. Protect portion of posts above ground from concrete splatter. Place concrete and vibrate or tamp for consolidation. Check posts for alignment and hold in position until concrete has achieved its initial set.
- C. Set anchor bolts and other embedded items required for installation. Use templates furnished by suppliers of items to be attached.
- D. Install signs level, plumb, and at height indicated, with surfaces free from distortion or other defects in appearance.

3.2 CLEANING

- A. After installation, surfaces marred during erection, and exposed bolts, bolt heads, etc., shall be retouched with the same paint used previously.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cast-in-place concrete and related installation accessories, including, but not limited to:
1. Formwork
 2. Reinforcement
 3. Concrete materials
 4. Mix design
 5. Placement procedures
 6. Standard concrete finishing
 7. Architectural concrete finishes

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for each type of manufactured material and product, including accessory products.
- B. Design Mixes: Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments. Review of mix designs by Architect and/or Engineer shall in no way relieve the Contractor of responsibility for the performance of the concrete.
- C. Shop Drawings:
1. Steel Reinforcement: Show details of fabrication, bending, and placement. Drawings shall be prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement.
 2. Joints: Show proposed location of construction joints, expansion/contraction joints and control joints and obtain approval from Architect prior to construction.
- D. Samples: Submit 4 inch long samples of expansion/contraction joint and control joint.
- E. Welding Certificates: Copies of certificates for welding procedures and personnel.
- F. Material Certificates: Signed by manufacturers certifying that the following items comply with requirements:
1. Cementitious materials and aggregates.
 2. Form materials and form-release agents.
 3. Steel reinforcement and reinforcement accessories.
 4. Admixtures.
 5. Curing materials.
 6. Floor and slab treatments.
 7. Bonding agents.
 8. Adhesives.
 9. Vapor retarders.
 10. Epoxy joint filler.
 11. Joint-filler strips.
 12. Repair materials.
 13. Integral color agents

- G. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician. Installer shall have a minimum of 5 years experience with concrete Work similar in material, design, and extent to that indicated for this Project.
2. Design Mix Engineer: Engineer having minimum 10 years documented experience in determining concrete design mix, licensed in the State of Arizona. Design Mix Engineer shall stamp and seal mix designs and make determinations regarding maximum slump, additives, and water added to mix at the site.
3. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
4. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

1. Obtain cement and aggregates from a single source for specialty concrete finishes to provide uniformity in appearance and color.

- C. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel."

- D. Standards: Comply with the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
3. ACI 347 R - Guide to Formwork for Concrete.

E. Mockups:

1. Prior to commencing concrete work, construct field samples for each type of color and finish used on project. Construct samples at locations indicated on drawings or as directed by Architect.
2. Samples shall be a minimum of 4 feet square, unless otherwise directed by Architect and shall include one longitudinal and one transverse joint.
3. Notify Architect 7 days prior to the day when field samples will be cured and finished and ready for review.
4. Obtain Architect's approval of samples prior to commencing work.
5. If Architect determines that samples do not meet requirements, demolish and remove from the site. Produce successive samples until approved by Architect.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work. Do not remove until authorized in writing from the Architect.
7. Remove and dispose of samples in a legal manner.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Reinforcement: Deliver reinforcement to the Project site in a manner that will prevent bending and damage. Reinforcement shall be bundled, tagged and marked to facilitate sorting and placing. Tags shall indicate bar sizes, lengths, grade and other information corresponding to markings shown on placement diagrams.
- B. Storage and Protection: Store materials at the site off the ground and in a manner to prevent damage to the materials.

1.5 PROJECT CONDITIONS

- A. Rain protection: Do not place concrete during rain unless adequate protection has been provided.
- B. Cold weather protection: Comply with ACI-306R.
- C. Hot weather protection: Comply with ACI-305R.

PART 2 - PRODUCTS

2.1 FORMWORK

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Debond Form Coating as manufactured by L&M Construction Chemicals, Inc.
 - b. Crete Lease 880 as manufactured by Cresset Chemical
 - c. Nox-Crete as manufactured by Nox-Chem
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish ties that, when removed, will leave holes not larger than 1-inch in diameter in concrete surface.

2.2 REINFORCEMENT

- A. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.
- B. Steel Reinforcement Bars: ASTM A 615, deformed, Grade 60, with a minimum yield of 60,000 psi.

- C. Plain-Steel Welded Wire Fabric: ASTM A 185
 - 1. Wire: Plain steel, ASTM A82.
 - 2. Gages and Configuration: As indicated on General Structural Notes.
- D. Reinforcement Accessories:
 - 1. Bar Supports: Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete:
 - a. Concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
 - 2. Joint Dowel Bars: Plain-steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type II, alkali content not to exceed 0.6 percent.
- B. Blended Hydraulic Cement: ASTM C 595, Type IP, portland-pozzolan cement.
- C. Fly Ash: ASTM C 618, Class F.
- D. Aggregate:
 - 1. Normal Weight: ASTM C 33, free from deleterious material and meeting the limits in Table 3 of ASTM C 33 for the weathering region applicable to the project site. Coarse aggregate should be size number 57 or 67 unless otherwise specified in the Contract Documents.
 - 2. Exposed Aggregate: Clean, river run crushed coarse aggregate and gravel, free from foreign matter conforming to ASTM C 33, Class 5S. Gradation to be ASTM C 33, Size 8, except that the aggregate shall be "gap-graded".
- E. Water: Potable and complying with ASTM C 94.
- F. Concrete Admixtures: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials.
 - 1. Admixtures containing calcium chloride are not permitted.
 - 2. Air-Entraining Admixture: ASTM C 260.
 - 3. Water Reducing Admixtures: ASTM C 494 Type A water reducing admixtures and Type G and F high-range water reducing admixtures.
- G. Coloring Agent: ASTM C979, Color weight shall not exceed 10% of the weight of the cement.
 - 1. Colors: As selected by Architect.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Frank Davis Company
 - b. L.M. Scofield Company
 - c. Solomon Grind-Chem Service, Inc.

2.4 ACCESSORIES

- A. Water: Potable.
- B. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Fortifiber Corporation; Moistop Ultra A.

2. Raven Industries Inc.; Vapor Block 15.
 3. Reef Industries, Inc.; Griffolyn Type-65G.
- C. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. Acceptable Products: Subject to compliance with requirements, provide one of the following:
 - a. Sure Film; Dayton Superior Corporation.
 - b. Eucobar; Euclid Chemical Co.
 - c. E-Con; L&M Construction Chemicals, Inc.
 - d. Confilm; Master Builders, Inc.
 - e. SikaFilm; Sika Corporation.
- D. Leveling Agent: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Acceptable Products: Subject to compliance with requirements, provide one of the following:
 - a. Sonoflow; Sonneborn
 - b. Flo-Top; Euclid
 - c. Ardex K-15; Maxxon Corporation
 - d. Levelex; L&M Construction Chemicals
 - e. Levelayer 1; Dayton-Superior
- E. Repair Topping – Exposed Locations: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.
- F. Exposed Aggregate Concrete Retarder: Subject to compliance with requirements, provide one of the following:
1. Horizontal Surfaces:
 - a. Rugasol-S, Sika Corporation, Lyndhurst, NJ (800) 222-7452
 - b. Preco EAC-S, Preco, Plainview, NY (800) 645-1237
 - c. Euclid Concrete Surface Retarder "S."
- G. Salt for Salt Texture Finish:
1. Ordinary sodium chloride, kiln dried and packaged water softener salt equal to Leslie Salt Co. or Morton's Kiln Dried Coarse Softener Salt.
 2. Deliver salt to the job site clean and free from dirt or other contamination.
 3. Use coarse size with a gradation that permits 100% to pass a 1/8" sieve and 85% to remain on the #8 sieve.
- H. Curing Materials: Provide one of the following methods as appropriate to indicated finish and as recommended by floor treatment and finish manufacturers. Verify that specified curing compound is compatible with the floor finish material(s) and adhesive(s) that will be applied to floor surface prior to delivery of curing compound to jobsite. If it is determined that the curing compound is not compatible, notify Architect immediately.
1. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
 2. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
 3. Curing Compound: Water based, dissipating resin, ASTM C 309, Type 1, Class B.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Cure R; L & M Construction Chemicals, Inc.
 - 2) Rez Cure J-11W/J-9-A; Dayton Superior Corporation.
 - 3) Kurez VOX; Euclid Chemical Co.
 - 4) 1100; W. R. Meadows, Inc.

- I. Curing and Sealing Compound: ASTM C 1315, Type 1, membrane forming.
 - 1. Interior: ASTM C1315, Class B.
 - a. Acceptable Products: Subject to compliance with requirements, provide one of the following:
 - 1) VOCOMP-30; W. R. Meadows
 - 2) Super Aqua Cure VOX; Euclid
 - 3) Dress & Seal WB #30; L&M Construction Chemicals
 - 4) Safe Cure and Seal J-19; Dayton Superior
- J. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
- K. Joint Filler Elastomer: 100% solids polyurea filler. Shore A shall be 75 or higher. Tensile 620 psi, elongation minimum of 450% per ASTM C412.
 - 1. JOINT TITE 750; L&M Construction Chemicals, Inc.
 - 2. Spall Pro 2000; Metzger McGuire
- L. Bonding Agent: ASTM C 1059, capable of humid curing and bonding to damp surfaces, of type, class and grade to suit requirements:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Interior: PVA Type, ASTM C1059, Type 1
 - 1) EVERWELD; L&M Construction Chemicals, Inc.
 - 2) Weldcrete; Larsens
 - b. Exterior and Interior (acrylic):
 - 1) Acryl 60; Chem-Rex
 - 2) Intralok; W.R. Meadows
 - 3) Ad Bond J40; Dayton Superior
 - 4) Everbond; L&M Construction Chemicals, Inc.
- M. Nails, Spikes, Lag Bolts, Through Bolts, and Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

2.5 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Proportion normal-weight concrete mix as follows:
 - 1. Compressive Strength (28 Days): As indicated on General Structural Notes and Drawings.
 - 2. Maximum Slump: As indicated on General Structural Notes and Drawings.
- D. Slump Tolerances: Slump tolerances per ASTM C 94, Section 6 as follows:
 - 1. When project specifications for slump are written as a "maximum" or "not to exceed" requirement:

	If 3 inches or less	If more than 3 inches
Plus tolerance	0	0
Minus tolerance	1-1/2 inches	2-1/2 inches

- E. Cementitious Materials: Maximum percentage, by weight, of cementitious materials other than portland cement:
 - 1. Fly Ash: 15 percent.
- F. Maximum Water-Cementitious Materials Ratios: 0.50, unless otherwise approved by Structural Engineer.
- G. Air Content:
 - 1. Total air content requirements shall be in accordance with Table 1 of ASTM C 94 for the maximum size of aggregate and exposure conditions.
 - 2. Add air-entraining admixture at manufacturer's prescribed rate.
 - 3. Air content shall be sampled from the transportation unit at the point of discharge and shall be within a tolerance of +/- 1.5% of the specified value per Section 7 of ASTM C 94.
 - 4. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.
- H. Admixtures: Use admixtures according to manufacturer's written instructions.
- I. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.
 - 1. Not more than 90 minutes shall elapse from time water is introduced into the concrete mixture until completion of placement.
 - 2. Water shall not be added at any later time. Do not add water to mix that has stiffened to increase its workability.
 - 3. Discharge of the concrete shall be completed within 90 minutes from the time of batching.
 - 4. Delivered concrete temperature shall be as follows:

<u>Section size, inches</u>	<u>Temp. F, minimum</u>
Less than 12 inches	55
12-36 inches	50
36-72 inches	45
More than 72 inches	40

2.6 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Permanently Exposed Locations: Class A, 1/8 inch.
 - 2. Surfaces to receive other finishes: Class B, 1/4 inch.
 - 3. Concealed Locations: Class C, 1/2 inch.
- D. Construct forms tight enough to prevent loss of concrete mortar.

- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Chamfer exterior corners and edges of permanently exposed concrete.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Locate temporary openings in forms at inconspicuous locations.
 - 1. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- L. Provide formed openings where required for items to be embedded in or passing through concrete work.
- M. Locate and set in place items which will be cast directly into concrete.
- N. Coordinate Work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors, and other inserts.
- O. Place and secure anchorage devices and other embedded items in accordance with Manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.2 REMOVING AND REUSING FORMS

- A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Formwork for beam soffits, joists, slabs, and other structural elements, that support the weight of concrete shall remain in place until concrete has achieved the following:
 - 1. 28-day design compressive strength or as required by General Structural Notes and Drawings.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

- D. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- E. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete.

3.3 VAPOR RETARDERS

- A. Vapor Retarder: Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
 - 2. Tears, punctures and penetrations shall be taped to maintain the moisture vapor resistance integrity of vapor barrier.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. Use bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 07900 – Joint Sealants are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
 2. Do not apply rubbed finish to smooth-formed finish.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Mix and apply evaporation retarder in accordance with manufacturer's printed instructions immediately after floating. In extreme drying conditions, apply additional material as needed. Apply lightly on hard to trowel floor areas.

- C. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Locations: Apply a trowel finish to surfaces indicated and as follows:
 - a. Floor and slab surfaces exposed to view
 - b. Floor and slab surfaces to be covered with the following:
 - 1) Resilient flooring
 - 2) Carpet
- D. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
1. Locations: Apply to surfaces indicated and as floor and slab surfaces as follows:
 - a. Indicated to receive thinset or thickset installed tile.
- E. Broom Finish: Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
1. Locations: Apply to exterior concrete sidewalks, platforms, steps, and ramps, and elsewhere as indicated.
- F. Tolerances: Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155 for a randomly trafficked floor surface:
1. Finish and measure surface so gap at any point between concrete surface and an unlevelled freestanding 10-foot- long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:
 - a. Typical: 1/4 inch.
 - b. Locations Scheduled to receive thin set tile applications: 1/8 inch.

3.9 SPECIAL FINISHES

- A. Placing: Place concrete at a maximum slump of 5 inches. Rake concrete into place, screed and float. Do not tamp.
- B. Integral Colored Concrete:
1. Provide cement, aggregate, and pigment as required to produce consistent colors matching approved mock-up using the materials specified.
 2. Plant-Mixed Concrete: Schedule delivery of concrete to provide consistent mix times from batching until discharge.
 3. Concrete Paving: Schedule placement to minimize exposure to wind and hot sun before curing materials is applied. Avoid placing concrete if rain, snow or frost is forecast within 24 hours. Protect fresh concrete from moisture and freezing.
 4. Formed Surfaces
 - a. Stripping: Leave forms in place as long as practical. Remove forms when concrete has reached a consistent age to maintain uniformity of curing conditions throughout Project.
 5. Floors and Paving
 - a. Broomed Finish: Do not over-dampen brooms.
 - b. Trowel Finish: Do not over-trowel or start troweling late.
 6. Patching Concrete
 - a. Fill holes and defects in concrete surface within 48 hours of form removal.
 - b. Use the same patching materials and techniques that were approved on mock-up.

- c. Make patches with a stiff mortar made with materials from the same sources as the concrete. Adjust mortar mix proportions so dry patch matches dry adjacent concrete. Add white cement to mortar mix if necessary to lighten it.
7. Curing
 - a. Maintain concrete between 65 and 85 F degrees during curing.
 - b. Cure concrete using curing compound; apply curing compound in accordance with manufacturer's instructions.
 8. Minor variations in appearance of colored concrete, which are similar to natural variations in color and appearance of unpigmented concrete, are acceptable.
- C. Rock Salt Finish (Flatwork):
1. After placing concrete strike off the surface with a straight-edge.
 2. Use tamper or jitterbugs lightly.
 3. Float and/or darby the surface.
 4. Leave the surface in this floated condition until the concrete has started to set.
 5. Continue finishing when the concrete has set sufficiently to accept a man's weight on kneeboards.
 6. Handfloat the surface with a lightweight metal float and true edges and joints.
 7. Distribute salt on the surface in a random pattern at the rate of approximately 5 pounds per 100 square feet to match sample.
 8. Press salt grains into the surface with trowel pressure so the grains are embedded just barely below the surface, leaving the tops of the grains exposed.
 9. Cure the surface with waterproof building paper. Do not use plastic sheeting or curing compound on this type of work.
 10. After the concrete has completely hardened, wash the salt away by thorough flooding with water.
- D. Integrally Colored, Salt Finish Concrete: Conform to applicable requirements specified above for integrally colored concrete finishing and salt finish. Apply specified rock salt in amounts required to obtain texture to match sample approved by Architect. After concrete setting, clean and well rinse concrete surface and apply curing compound as specified above for integrally colored concrete finishing.
- E. Exposed Aggregate Concrete Finish: Conform to PCA Publication No. IS171.01A "Exposed Aggregate Concrete." Produce and finish in following manner:
1. Horizontal Exposed Aggregate Slabs: Produce by use of retarder agent applied to concrete surface as per Manufacturer's printed instructions for penetration of 3/16 inch. After finishing and removing water puddled on surface, apply retarder with pressure spray at approximately 100 square feet per gallon.
 2. Exposed Aggregate Finishing: Remove surface retarded mortar with water pressure stream from hose and a stiff brush within a period of 12 to 24 hours after placement, depending upon temperature and climatic conditions at time of placement. Follow retardant Manufacturer's Specifications to obtain deep exposed aggregate finish to match sample approved by Architect.
 3. Curing: Upon completion of placement and finishing, and not more than 24 hours after placing, apply specified non-yellowing curing and sealing compound per manufacturer's instructions. Plastic sheeting, other curing compounds or fine water fog mist shall not be used which would be detrimental to color uniformity.
- F. Protection: Protect specially finished concrete slabs from damage, by covering with a one inch layer of clear, dry sand. Provide planking whenever scaffolding or wheeled equipment may be required to be erected over slabs. Damage to slabs prior to acceptance of the Work will be cause for rejection of slabs and replacement will be required.

3.10 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after initial placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If forms are removed prior to end of curing period, continue curing using curing methods specified herein.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete using curing methods specified herein.
- E. Curing Methods: Cure concrete according to ACI 308.1, by one or a combination of the following methods. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
 - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
- F. Sealer:
 - 1. At areas indicated on Drawings, provide 2 coats of sealer.
 - 2. Surface must be clean, dry and free of loose dirt, oil, wax, curing and parting compounds and other foreign matter.
 - 3. Apply each coat in accordance with Manufacturer's printed instructions.

3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged a minimum of 30 days.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install joint filler per manufacturer's recommendations. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas concealed from view. Do not patch, repair or replace exposed architectural concrete except upon written direction of Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Concealed Locations: Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension. Remove defective concrete to a depth of 3/4-inch to 1-inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Surfaces exposed to view: Repair defects by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Surfaces that affect concrete's durability and structural performance: Repair defects upon direction of Architect and Structural Engineer.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than 5 compressive-strength tests for each concrete mix, testing shall be conducted from at least 5 randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of 4 standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39; test 2 laboratory-cured specimens at 7 days and one at 28 days and hold one cylinder for additional information, as required.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
 7. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 8. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.
- C. Strength of each concrete mix will be satisfactory if every average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

3.14 PROTECTION

- A. Protect finished surfaces from stains or abrasions. Protect surfaces or edges by leaving forms in place or by providing temporary covers. Protect concrete from rain, flowing water or mechanical injury.
- B. Protect floor slabs from the droppings of plaster, paint, dirt, and other marring by covering with polyethylene plastic sheet, well lapped and sealed. Provide a continuous covering of 1/2 inch particle board, joints tightly butted and cut to sizes tight to wall construction, over entire floor area over polyethylene plastic sheet.

3.15 CLEANING

- A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 03380

POST-TENSIONED CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Post-tensioned concrete and related work, including post-tensioned floor slabs, cast-in embedments, and anchorage devices.

1.2 DEFINITIONS

- A. Strand Tail: Excess strand length extending past the anchorage device.
- B. Stressing Blockout: Opening created in the slab to allow access to stressing-end anchorages.
- C. Stressing Pocket: Void formed by pocket former at stressing-end anchorage to provide required cover over wedges and strand tail.
- D. Wedge Cavity: Cone-shaped hole in anchorage device designed to hold the wedges that anchor the strand.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design cast-in-place, post-tensioned concrete reinforcement as indicated in this Section. Show final effective forces, tendon profiles, and nonprestressed reinforcement on design Shop Drawings.
- B. Employ professional Engineer, registered in Arizona, and acceptable to Owner, to perform design. Sign and seal design Shop Drawings and design calculations submitted to Owner for review. Prepare and seal drawings and calculations for submittal to authorities having jurisdiction. Comply with design intent, criteria, and requirements of the Contract Documents.
- C. Comply with ACI 318 limits on stresses at transfer of prestress and under service load.
- D. Comply with ACI 318 requirements for minimum bonded reinforcement.
- E. Comply with ACI 318 requirements for concrete cover over reinforcement.
- F. Design members such that thickness and concrete cover over reinforcement comply with fire-resistance requirements of authorities having jurisdiction.

1.4 SUBMITTALS

- A. Product Data: For the following:
 1. Post-tensioning coating.
 2. Tendon sheathing.
 3. Anchorage devices.
 4. Tendon couplers.
 5. Bar and tendon supports.
 6. Pocket formers.
 7. Sheathing repair tape.
 8. Stressing-pocket patching material.

- B. Shop Drawings: Installation drawings including plans, elevations, sections, details, and notes prepared by or under the supervision of a registered professional engineer detailing tendon layout and installation procedures, including the following:
1. Numbers, arrangement, and designation of post-tensioning tendons.
 2. Tendon profiles and method of tendon support including chair heights and locations. Show tendon profiles at sufficient scale to clearly indicate all support points, with their associated heights.
 3. Construction joint locations pour sequence, locations of anchorages and blockouts required for stressing.
 4. Stressing procedures and jacking force to result in final effective forces used in determining number of tendons required.
 5. Sealed calculations prepared by a registered structural engineer indicating method of elongation calculation including values used for friction coefficients, anchorage seating loss, elastic shortening, creep, relaxation, and shrinkage.
 6. Calculated elongations for each tendon.
 7. Details for horizontal curvature around openings and at anchorages.
 8. Details for corners and other locations where tendon layouts may conflict with one another or nonprestressed reinforcing steel.
 9. Diagrams and notes as necessary for positioning of nonprestressed reinforcement required for installing post-tensioning tendons including, but not limited to, the following:
 - a. Support bars.
 - b. Backup bars and hairpins at anchorages.
 - c. Hairpins at locations of horizontal curvature.
 - d. Supplemental reinforcement at blockouts.
- C. Design Shop Drawings and calculations.
- D. Samples: For the following products:
1. Each anchorage device assembly with a minimum of 24 inches of coated, sheathed strand.
 2. Each coupler assembly with a minimum of 24 inches of coated, sheathed strand.
- E. Product Certificates:
1. For each type of anchorage device and coupler, signed by product manufacturer.
- F. Qualification Data: For Installer. Include resume of individual supervising installation and stressing of post-tensioning tendons.
- G. Mill Test Reports: Certified mill test reports for prestressing strand used on Project indicating that strand is low-relaxation and including the following:
1. Coil numbers or identification.
 2. Breaking load.
 3. Load at 1 percent extension.
 4. Elongation at failure.
 5. Modulus of elasticity.
 6. Diameter and net area of strand.
- H. Field quality-control test reports.
- I. Procedures Statement: Procedures for cutting excess strand tail and patching stressing pocket.
- J. Stressing Jack Calibration: Calibration certificates for jacks and gages to be used on Project. Calibrate each jack-and-gage set as a pair.

- K. Stressing Records: Filled out by testing agency during stressing operation with the following information recorded:
1. Name of Project.
 2. Date of approved installation drawings used for installation and stressing.
 3. Floor number and concrete placement area.
 4. Date of stressing operation.
 5. Weather conditions including temperature and rainfall.
 6. Name and signature of inspector.
 7. Name of individual in charge of stressing operation.
 8. Serial or identification numbers of jack and gage.
 9. Date of jack-and-gage calibration certificates.
 10. Gage pressure to achieve required stressing force per supplied calibration chart.
 11. Tendon identification mark.
 12. Calculated tendon elongation.
 13. Actual tendon elongation.
 14. Actual gage pressure.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer whose full-time Project superintendent has successfully completed PTI's Level 1 - Field Fundamentals course or has equivalent verifiable experience and knowledge acceptable to Architect.
1. Superintendent must have received training from post-tensioning supplier in the operation of stressing equipment to be used on Project.
- B. Manufacturer Qualifications: Fabricating plant certified by PTI according to procedures set forth in PTI's "Manual for Certification of Plants Producing Unbonded Single Strand Tendons."
- C. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
1. Testing Agency Inspector: Personnel performing field inspections and measuring elongations shall have successfully completed PTI's Level 1 - Field Fundamentals course or shall have equivalent qualifications acceptable to Architect.
- D. Source Limitations: Obtain post-tensioning materials and equipment from the same supplier.
1. Stressing jacks not provided by post-tensioning supplier must be calibrated and approved for use on Project by post-tensioning supplier.
- E. ACI Publications: Comply with ACI 423.6, "Specification for Unbonded Single Strand Tendons," unless otherwise indicated in the Contract Documents.
- F. Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to installation and stressing of post-tensioning tendons including, but not limited to, the following:
1. Construction schedule and availability of materials, personnel, and equipment needed to make progress and avoid delays.
 2. Storage of post-tensioning materials on-site.
 3. Structural load limitations.
 4. Coordination of post-tensioning installation drawings and nonprestressed reinforcing steel placing drawings.
 5. Horizontal and vertical tolerances on tendon and nonprestressed reinforcement placement.
 6. Marking and measuring of elongations.
 7. Submittal of stressing records and requirements for tendon finishing.
 8. Removal of formwork.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle post-tensioning materials according to PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."
- B. Inspect tendons and accessory items at time of their delivery to Project site, prior to off-loading. Notify post-tensioning supplier of observed damage prior to off-loading.
- C. Keep accurate and current records of materials delivered and used.
- D. Immediately remove from Project site any tendons with damaged strand.

1.7 COORDINATION

- A. Attachments and Penetrations:
 - 1. Attach permanent fixtures such as curtain-wall systems, handrails, fire-protection equipment, lights, and security devices to the slab using embedded anchors. Drilled anchors are not allowed unless authorized in writing by Architect.
 - 2. Power-driven fasteners are not allowed unless authorized in writing by Architect.
 - 3. Core drilling for sleeves or other penetrations is not allowed unless authorized in writing by Architect.
 - 4. Protect penetrations within 18 inches of an anchorage with ASTM A 53, Schedule 40 steel pipe.

PART 2 - PRODUCTS

2.1 PRESTRESSING TENDONS

- A. Prestressing Strand: ASTM A 416, Grade 270, uncoated, 7-wire, low-relaxation, and in accordance with General Structural Notes and Drawings.
- B. Post-Tensioning Coating: Compound with friction-reducing, moisture-displacing, and corrosion-inhibiting properties specified in ACI 423.6; chemically stable and nonreactive with prestressing steel, nonprestressed reinforcement, sheathing material, and concrete.
 - 1. Completely fill annular space between strand and sheathing over entire tendon length with post-tensioning coating.
- C. Tendon Sheathing: Comply with ACI 423.6, continuous over the entire length of tendon between anchorages to prevent intrusion of cement paste or loss of coating for a non-encapsulated system.
- D. Anchorage Device and Coupler Assembly: Assembly of strand, wedges, and anchorage device or coupler complying with static and fatigue tests requirements in ACI 423.6 and capable of developing 95 percent of actual breaking strength of strand.
 - 1. Anchorage Bearing Stresses: Comply with ACI 423.6 for stresses at transfer load and service load.
 - 2. Fixed-End Anchorage Device Assemblies: Plant fabricated with wedges seated at a load of not less than 80 percent and not more than 85 percent of breaking strength of strand.

2.2 NONPRESTRESSED STEEL BARS

- A. Support Bars, Reinforcing Bars, Hairpins: ASTM A 615, Grade 60, deformed. Minimum support bar size is 1/2 inch.

- B. Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening tendons and tendon support bars in place. Manufacture bar supports, according to CRSI's "Manual of Standard Practice," from steel wire, plastic, or precast concrete of greater compressive strength than concrete and as approved by Structural Engineer.

2.3 ACCESSORIES

- A. Pocket Formers: Capable of completely sealing wedge cavity; sized to provide the required cover over the anchorage and allow access for cutting strand tail.
- B. Sheathing Repair Tape: Elastic, self-adhesive, moistureproof tape with minimum width of 2 inches, in contrasting color to tendon sheathing; nonreactive with sheathing, coating, or prestressing steel.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Adhesive Tape Products, Inc.; PWT-20.
 - b. 3M; Tape 226.
 - c. Tyco Adhesives; Polyken 826.
- C. Distribution plates: Welded steel or cast steel bearing assemblies that will permanently support and distribute the load from the anchoring devices as follows:
 - 1. Do not exceed the maximum concentrated bearing stress in the concrete permitted by ACI 318.
 - 2. Bending stresses in the plates induced by the pull of the prestressing steel shall not exceed 20,000 psi for structural steel and 15,000 psi for cast steel, except if acceptable test data indicates that higher stresses are satisfactory. For high strength steel, correspondingly higher stresses may be permitted.
 - 3. Provide materials which meet requirements of ASTM A 36 for structural shapes, or ASTM A 148 for cast steel, or higher quality materials as required to meet stress requirements.
 - 4. Design, fabrication and erection shall meet the latest AISC Standards, Welding AWS Standards including Qualification Test of Welders.
 - 5. Furnish high-tensile steel bolts and nuts, when so called for on the Drawings, which conform to ASTM A 325.
 - 6. Distribution plates may be omitted, if the bearing area of any anchoring device is sufficiently large so that the local concentrated bearing compressive stresses do not exceed the stresses permitted above or cause local failure.

2.4 PATCHING MATERIAL

- A. Patching Material: One component, polymer-modified, premixed patching material containing selected silica aggregates and portland cement; suitable for vertical and overhead application. Do not use material containing chlorides or other chemicals known to be deleterious to prestressing steel or material that is reactive with prestressing steel, anchorage device material, or concrete.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Euclid Chemical Company (The); Verticoat Supreme.
 - b. Master Builders, Inc.; Emaco R350 CI.
 - c. Sika Corporation, Inc.; SikaMonoTop 612.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Provide formwork for post-tensioned elements as specified in Division 3 Section "Cast-in-Place Concrete." Design formwork to support load redistribution that may occur during stressing operation. Ensure that formwork does not restrain elastic shortening, camber, or deflection resulting from application of prestressing force.
- B. Do not remove forms supporting post-tensioned elements until tendons have been fully stressed and elongations have been approved by Architect, unless authorized in writing by Architect.
- C. Do not place concrete in supported floors until tendons on supporting floors have been stressed and elongations have been approved by Architect, unless authorized in writing by Architect.

3.2 NONPRESTRESSED STEEL REINFORCEMENT PLACEMENT

- A. Placement of nonprestressed steel reinforcement is specified in Section 03300 - Cast-in-Place Concrete and on General Structural Notes and Drawings. Coordinate placement of nonprestressed steel reinforcement with installation of post-tensioning tendons.

3.3 TENDON INSTALLATION

- A. Install tendons according to approved installation drawings and procedures stated in PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."
- B. Tendon Supports: Provide continuous slab bolsters or bars supported on individual high chairs spaced at a maximum of 42 inches o.c. to ensure tendons remain in their designated positions during construction operations and concrete placement.
 - 1. Support tendons as required to provide profiles shown on installation drawings. Position supports at high and low points and at intervals not exceeding 48 inches. Ensure that tendon profiles between high and low points are smooth parabolic curves.
 - 2. Attach tendons to supporting chairs and reinforcement without damaging tendon sheathing.
 - 3. Support slab tendons independent of beam reinforcement.
- C. Maintain tendon profile within maximum allowable deviations from design profile as follows:
 - 1. 1/4 inch for member depth less than or equal to 8 inches.
 - 2. 1/4 inch for member depth greater than 8 inches and less than or equal to 24 inches.
 - 3. 1/2 inch for member depth greater than 24 inches.
- D. Maintain minimum radius of curvature as indicated on General Structural Notes and Drawings. Maintain a minimum of 2 inches of separation between tendons at locations of curvature.
- E. Limit tendon bundles to five tendons. Do not twist or entwine tendons within a bundle. Maintain a minimum distance of 12 inches between centers of adjacent bundles.
- F. If tendon locations conflict with nonprestressed reinforcement or embedded items, tendon placement governs unless changes are authorized in writing by Architect. Obtain Architect's approval before relocating tendons or tendon anchorages that interfere with one another.
- G. Deviations in horizontal spacing and location of slab tendons are permitted when required to avoid openings and inserts.

H. Installation of Anchorage Devices:

1. Place anchorage devices at locations shown on approved installation drawings.
2. Do not switch fixed and stressing-end anchorage locations unless authorized in writing by Architect.
3. Attach pocket formers, intermediate anchorage devices, and stressing-end anchorage devices securely to bulkhead forms. Install stressing-end and intermediate anchorage devices perpendicular to tendon axis.
4. Install tendons straight, without vertical or horizontal curvature, for a minimum of 12 inches behind stressing-end and intermediate anchorages.
5. Embed intermediate anchorage devices at construction joints in first concrete placed at joint.
6. Minimum splice length in reinforcing bars at anchorages is 24 inches. Stagger splices a minimum of 60 inches.
7. Place fixed-end anchorage devices in formwork at locations shown on installation drawings. Support anchorages firmly to avoid movement during concrete placement.

I. Maintain minimum concrete cover as follows:

1. From Exterior Edge of Concrete to Wedge Cavity: 1-1/2 inches.
2. From Exterior Edge of Concrete to Strand Tail: 3/4 inch.
3. Top, Bottom, and Edge Cover for Anchorage Devices: 3/4 inch.

J. Maintain minimum clearance of 6 inches between tendons and openings.

K. Prior to concrete placement, mark tendon locations on formwork with spray paint.

L. Do not install sleeves within 36 inches of anchorages after tendon layout has been inspected unless authorized in writing by Architect.

M. Do not install conduit, pipe, or embeds requiring movement of tendons after tendon layout has been inspected unless authorized in writing by Architect.

N. Do not use couplers unless location has been approved by Architect.

3.4 SHEATHING INSPECTION AND REPAIR

A. Inspect sheathing for damage after installing tendons. Repair damaged areas by restoring post-tensioning coating and repairing or replacing tendon sheathing.

1. Ensure that sheathing is watertight and there are no air voids.
2. Follow tape repair procedures in PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."

B. Maximum length of exposed strand behind anchorages is as follows:

1. Fixed End: 12 inches.
2. Intermediate and Stressing End: 0 inches.

C. Immediately remove and replace tendons that have damaged strand.

3.5 CONCRETE PLACEMENT

A. Do not place concrete until placement of tendons and nonprestressed steel reinforcement has been inspected.

B. Provide Architect and testing agency a minimum of 48 hours' notice before concrete placement.

- C. Place concrete as specified in Section 03300 - Cast-in-Place Concrete. Ensure compaction of concrete around anchorages.
- D. Ensure that position of tendon and nonprestressed steel reinforcement does not change during concrete placement. Reposition tendons and nonprestressed steel reinforcement moved during concrete placement.
- E. Ensure that method of concrete placement does not damage tendon sheathing. Do not support pump lines, chutes, or other concrete placing equipment on tendons.

3.6 TENDON STRESSING

- A. Calibrate stressing jacks and gages at start of job and at least every six months thereafter. Keep copies of calibration certificates for each jack-and-gage pair on Project site and available for inspection. Exercise care in handling stressing equipment to ensure that proper calibration is maintained.
- B. Stress tendons only under supervision of qualified post-tensioning superintendent.
- C. Do not begin stressing operations until concrete strength has reached 3000 psi as indicated by compression tests of field-cured cylinders.
- D. Complete stressing within 72 hours of concrete placement.
- E. If concrete has not reached required strength, obtain Architect's approval to partially stress tendons and delay final stressing until concrete has reached required strength.
- F. If detensioning and restressing of tendon is required, discard wedges used in original stressing and provide new wedges.
- G. Mark and measure elongations according to PTI's "Field Procedures Manual for Unbonded Single Strand Tendons." Measure elongations to closest 1/8 inch.
- H. Submit stressing records within one day of completion of stressing. If discrepancies between measured and calculated elongations exceed plus or minus 7 percent, resolve these discrepancies to satisfaction of Architect.
- I. Prestressing will be considered acceptable if gage pressures shown on stressing record correspond to required stressing force and calculated and measured elongations agree within 7 percent.
- J. If measured elongations deviate from calculated elongations by more than 7 percent, additional testing, restressing, strengthening, or replacement of affected elements may be required.

3.7 TENDON FINISHING

- A. Do not cut strand tails or cover anchorages until stressing records have been reviewed and approved by Architect.
- B. Cut strand tails as soon as possible after approval of elongations.
- C. Cut strand tail between 1/2 and 3/4 inch from wedges. Do not damage tendon or concrete during removal of strand tail. Acceptable methods of cutting strand tail include the following:
 - 1. Oxyacetylene flame.
 - 2. Abrasive wheel.

3. Hydraulic shears.
 4. Plasma cutting.
- D. Patch stressing pockets within one day of cutting strand tail. Clean inside surface of pocket to remove laitance or post-tensioning coating before installing patch material. Finish patch material flush with adjacent concrete.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports. Cooperate with testing agency to facilitate the execution of its duties.
1. Before concrete placement, testing agency will inspect the following for compliance with post-tensioning installation drawings and the Contract Documents:
 - a. Location and number of tendons.
 - b. Tendon profiles and cover.
 - c. Installation of backup bars, hairpins, and other nonprestressed reinforcement shown on post-tensioning installation drawings.
 - d. Installation of pocket formers and anchorage devices.
 - e. Repair of damaged sheathing.
 2. Testing agency will record tendon elongations during stressing.
 3. Testing agency will immediately report deviations from the Contract Documents to Architect.

3.9 PROTECTION

- A. Do not expose tendons to electric ground currents, welding sparks, or temperatures that would degrade component.
- B. Protect exposed components within one workday of their exposure during installation.
- C. Prevent water from entering tendons during installation and stressing.
- D. Provide weather protection to stressing-end anchorages if strand tails are not cut within 10 days of stressing the tendons.

3.10 REPAIRS

- A. Submit repair procedure to Architect for evaluation and approval.
- B. Do not proceed with repairs requiring removal of concrete unless authorized in writing by Architect.

END OF SECTION

SECTION 04220

UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Unit masonry assemblies as follows:
1. Concrete masonry units.
 2. Mortar and grout.
 3. Reinforcing steel.
 4. Masonry joint reinforcement.
 5. Miscellaneous masonry accessories.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's data for each different masonry unit, accessory and other manufactured product specified.
- B. Shop Drawings:
1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
- C. Samples:
1. Masonry Units: Submit 2 full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
1. Each type of masonry unit required.
 2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
 3. Each material and grade indicated for reinforcing bars.
 4. Each type and size of joint reinforcement.

1.3 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.
- B. Source Limitations
1. Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
 2. Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- C. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be made by Owner:
1. Prism Test: For each type of wall construction indicated, per ASTM C 1314.

D. Standards:

1. The "Levels of Quality", Standard 107 of Arizona Masonry Guild (AMG) shall apply and by reference is hereby made a part of this Specification. Reference to Custom, Standard or Economy in this Specification shall be as defined in latest edition of AMG Standard 107.
2. Comply with the requirements of ACI 530.1/ASCE 6 "Specifications for Masonry Structures", except as otherwise indicated.

E. Regulatory Requirements:

1. Masonry materials and workmanship shall meet requirements of building codes which are applicable to jurisdiction in which Project is located.

F. Certifications: Concrete masonry units shall be supplied by a manufacturer participating in the Certified Block Program of the Arizona Masonry Guild.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Transport and handle masonry units in such a manner as to prevent chipping and breakage.
- B. Store masonry units on elevated platforms in a dry location.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
- G. Replace damaged material at no cost to Owner.

1.5 PROJECT CONDITIONS

A. Cold-Weather Requirements:

1. Protect masonry units from freezing weather and prevent accumulation of ice.
2. Do not build on frozen substrates.
3. Remove and replace unit masonry damaged by frost or by freezing conditions.
4. Do not lay concrete masonry units when temperature of surrounding atmosphere is below 40 degrees F. or is likely to fall below 40 degrees F. in the 24 hour period after laying, unless adequate protection is provided.
5. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

- B. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

1.6 SCHEDULING

- A. Coordination: Coordinate with other Trades whose Work relates to concrete masonry unit installation for placing required blocking, backing, furring, conduits and other items.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. General:
1. Concrete masonry units shall meet ASTM C90, Grade I requirements
 2. Units shall be in the same condition in wall as they were upon delivery.
 3. Units not complying with the appropriate ASTM Standards and AMG Standard 107 shall not be laid in the wall where exposed to view. Any unit that is chipped in excess of the requirements of AMG Standard 107 will be rejected and shall be removed and replaced.
 4. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
- B. Concrete Masonry Units:
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength as indicated on General Structural Notes and Drawings.
 2. Weight Classification: Medium weight or Normal weight as approved by Structural Engineer.

2.2 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type II, Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
- D. Aggregate:
1. Mortar: ASTM C 144; Clean, sharp and well graded and free from injurious amounts of dust, lumps, shale, alkali, surface coatings and organic matter, conforming to ASTM C144, except that no less than 3 percent nor more than 10 percent shall pass a No. 100 sieve except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 2. Grout: ASTM C 404.

- E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.
 - 1. Acceptable Manufacturers:
 - a. Accelguard 80; Euclid Chemical Co.
 - b. Morseled; W. R. Grace & Co., Construction Products Division.
 - c. Trimix-NCA; Sonneborn, Div. of ChemRex, Inc.
- F. Water: Potable.

2.3 REINFORCING STEEL

- A. Uncoated Steel Reinforcing Bars: ASTM A 615; ASTM A 616, including Supplement 1; or ASTM A 617, Grade 60.

2.4 MASONRY JOINT REINFORCEMENT

- A. General: ASTM A 951 and as follows:
 - 1. Single-wythe masonry: Provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16 inches o.c.
 - 2. Material: Hot-dip galvanized, carbon-steel wire.
 - 3. Wire Size for Rods:
 - a. 1/4 inch to 3/8 inch joints: W1.7 or 0.148-inch diameter.
 - b. 1/2 inch joints: W2.8 or 0.188-inch diameter.
 - 4. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units where indicated.

2.5 MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated.
- B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
 - 1. Styrene-Butadiene-Rubber Compound: ASTM D 2000, Designation M2AA-805.
 - 2. PVC: ASTM D 2287, Type PVC-65406.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication.
 - 1. Provide units with either two loops or four loops as needed for number of bars indicated.

2.6 MORTAR AND GROUT MIXES

- A. General: Use only those admixtures indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: ASTM C 270, Proportion Specification, Type S.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Job-Site Mixed: In accordance with ASTM C476.
 - 2. Transit-Mixed:
 - a. Designed by the supplier or an independent testing laboratory with a minimum compressive strength as indicated in the General Structural Drawings and Notes.
 - b. Slump: Not to exceed 8 inches, as measured according to ASTM C 143, unless otherwise noted on Drawings.
 - c. Use within 1-1/2 hours of initial mixing and do not use grout after it has begun to set or after it has become harsh or non-plastic.
- E. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's directions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance. Notify Contractor, in writing, conditions detrimental to proper and timely completion of Work. Do not proceed with the installation of unit masonry Work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
 - 1. Verify that foundations are within tolerances specified.
 - 2. Verify that reinforcing dowels are properly placed.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.2 PROTECTION

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

3.3 INSTALLATION

- A. General:
1. Build chases and recesses to accommodate items specified in this Section and in other Sections of the Specifications.
 2. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.
 3. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
 4. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

3.4 ERECTION

- A. General:
1. Workmanship:
 - a. Provide Custom Level workmanship as defined by AMG Standard 107.
 - b. Concrete masonry units which will be exposed in the finished work shall be treated as an architectural finish and shall be handled carefully to ensure that chippages do not occur during handling and laying. Handling shall be minimized on the jobsite to eliminate chances for chippage.
 - B. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
 - C. Bond Pattern: One-half running bond with vertical joint in each course centered on units in courses above and below. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
 - D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.
 - E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
 - F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.
 - G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
 - H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow masonry units as follows:
 1. With full mortar coverage on horizontal and vertical face shells.
 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
 3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.
- C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.6 MASONRY-CELL INSULATION

- A. Pour granular insulation into cavities as shown to fill void spaces completely. Maintain inspection ports to show the presence of insulation at the extremities of each pour area. Close the ports after complete coverage has been confirmed. Limit the fall of insulation to 1 story in height, but not to exceed 20 feet.

3.7 MASONRY JOINT REINFORCEMENT

- A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 1. Space reinforcement not more than 16 inches o.c.
 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

- B. Form control joints in concrete masonry using one of the following methods:
 - 1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake joints in exposed faces.
 - 2. Install preformed control-joint gaskets designed to fit standard sash block.
 - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake joint.
 - 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete.
 - 5. Control joint materials shall be held back from finished surface as required to allow for sealant and back-up materials.

- C. Build in horizontal, pressure-relieving joints where indicated; construct joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07900 - Joint Sealants.

3.9 REINFORCED UNIT MASONRY INSTALLATION

- A. Placing Reinforcement: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.

- B. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
 - 1. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.10 CONSTRUCTION TOLERANCES

- A. Comply with the following tolerances:
 - 1. Custom Level of Quality: In accordance with AMG Standard 107.

3.11 FIELD QUALITY CONTROL

- A. Owner will engage a qualified independent testing agency to perform field quality-control testing indicated below.
 - 1. Payment for these services will be made by Owner.
 - 2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

- B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.

- C. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM C 1314, and as follows:
 - 1. Prepare 1 set of prisms for testing at 7 days and 1 set for testing at 28 days.

3.12 REPAIRING, POINTING, AND MASONRY CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.

- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.13 CLEANING

- A. Remove scaffolding and equipment used in Work.
- B. Clean up debris, refuse and surplus material and remove from premises.

3.14 PROTECTION

- A. Furnish temporary protection for exposed masonry corners subject to injury.
- B. Carefully cover tops of walls left incomplete at conclusion of day's Work with tarpaulins or other approved covering.
- C. In hot and dry weather, protect masonry against too rapid drying.
- D. Protect finished Work against freezing for a period of not less than 48 hours by means of enclosures, artificial heat, or such other protective methods as may be required.

END OF SECTION

SECTION 04710
SIMULATED STONE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Simulated stone over the following substrates:
1. Exterior wood sheathing

1.2 SUBMITTALS

- A. Samples: Submit samples to the Architect for review prior to constructing job-site mock-ups, delivering materials to the site or commencing the work in this Section.
1. Simulated Stone Samples: Provide 8 samples of simulated stone, showing range of texture and/or color variations of the exposed surfaces.
 2. Mortar Color Samples:
 - a. Submit mortar channels for color selection.
 - b. Submit written colored mortar proportions for each color of mortar to be supplied for review by the Architect.
- B. Shop Drawings:
1. Submit Manufacturer's installation instructions and field erection or setting drawings indicating layout, pertinent dimensions, anchorages, reinforcement, head, jamb and sill opening details, and jointing methods.
- C. Product Data:
1. Submit manufacturer's data on simulated stone units and recommended sealer, if required.

1.3 QUALITY ASSURANCE

- A. Standards: The "Levels of Quality", Standard 107 of the Arizona Masonry Guild shall apply and by reference is hereby made a part of this Specification. Any reference to Custom, Standard or Economy in this Specification shall be as defined in the latest edition of AMG Standard 107.
- B. Applicator Qualifications: Company with minimum 3 years experience in the installation of manufactured stone veneers of the type specified.
- C. Regulatory Requirements: Materials and workmanship shall meet requirements of the building codes which are applicable to the jurisdiction in which Project is located.
- D. Mock-Ups: Prior to start of work, construct a sample panel from the approved materials, containing each different kind or color of simulated stone, approximately 4 feet high x 6 feet long or as required to illustrate wall design under the direction of the Architect.
1. Sample wall shall provide a standard of workmanship, bond, thickness and tooling of joints, range of color and texture of the simulated stone and mortar.
 2. Request Architect's review only after sample wall mortar is dry.
 3. Construct successive sample panels until the standard is approved.
 4. When accepted by Architect, sample wall shall be the standard of comparison for the remainder of the simulated stone work.
 5. Upon completion of the Project, remove the sample wall from the site and dispose of in a legal manner.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Transport and handle simulated stone in such a manner as to prevent chipping and breakage.
- B. Deliver and store materials in dry, protected areas.
- C. Keep free of stain or other damage.
- D. Locate storage piles, pallets, stacks or bins to avoid or protect material from heavy or unnecessary traffic.
- E. Replace damaged material at no cost to Owner.

1.5 PROJECT/SITE CONDITIONS

- A. Hot Weather Requirements:
 - 1. When the ambient air temperature exceeds 100 degrees F., or when the ambient air temperature exceeds 90 degrees F. and the wind velocity is greater than 8 mph, the Simulated Stone Contractor shall implement hot weather protection procedures as submitted to the Architect.
 - 2. Do not spread mortar beds more than 4 feet ahead of placing simulated stone.
 - 3. Place simulated stone within one minute of spreading mortar.
- B. Cold Weather Requirements:
 - 1. Fully protect simulated stone against freezing by a weather-tight covering which shall also prevent accumulation of ice.
 - 2. Do not lay simulated stone when the temperature of the surrounding atmosphere is below 40 degrees F. or is likely to fall below 40 degrees F. in the 24 hour period after laying, unless adequate protection is provided.
- C. Field Measurements:
 - 1. Verify measurements shown on Drawings by taking field measurements.
 - 2. Proper fit and attachment of simulated stone is required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products as manufactured by one of the following:
 - 1. Cultured Stone Corporation, a Division of Owen's Corning.
 - 2. Coronado Stone Products, 800-84-STONE, www.coronando.com.

2.2 SIMULATED STONE VENEER

- A. Stone:
 - 1. Specifications are based on Coronado Stone Products.
 - 2. Simulated stone to simulate native field type stone to match size(s), color(s) and textures of sample in Architect's office with "natural" variations.
- B. Fabrication:
 - 1. Form external corners to joint profile as indicated on Drawings.
 - 2. Slope exposed top surfaces of simulated stone for natural wash.

3. Coat back and cavity surfaces of simulated stone with bituminous back coating to surfaces not in contact with mortar. Allow coating to cure.

2.3 BROWN COAT (if required by stone manufacturer)

- A. Water: Clean and free of deleterious matter.
- B. Portland Cement: Conform to ASTM C150, Type I or II.
- C. Hydrated Lime: Conform to ASTM C207, Type S.
- D. Aggregate shall be clean, well graded sand or screenings from crushed stone or slag, and shall conform to ASTM C33 for fine aggregate except that it shall be graded within the following limitations:
 1. Passing No. 4 sieve: 100 percent
 2. Passing No. 8 sieve: 90 percent
 3. Passing No. 16 sieve: 60 percent-90 percent
 4. Passing No. 30 sieve: 35 percent-70 percent
 5. Passing No. 50 sieve: 10 percent-30 percent
 6. Passing No. 100 sieve: 5 percent

2.4 WEATHER-RESISTIVE BARRIER AND FURRING AND LATHING

- A. Weather Resistive Barrier: Provide one of the following as approved by stone manufacturer and Architect:
 1. Asphalt-impregnated paper factory-bonded to back of lathing and complying with FS UU-B-790, for Type I, Grade D (Vapor Permeable), style 2.
 2. Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.
- B. Metal Lath: 2.5 lb./sq.yd. expanded metal diamond mesh, self-furring type; galvanized finish.
- C. Anchorages: Nails, staples, or other approved metal supports, of type and size to suit application, galvanized to rigidly secure lath and associated metal accessories in place.

2.5 ACCESSORIES

- A. Mortar:
 1. ASTM C270, Type N mortar, or Type S as recommended by manufacturer.
 2. Mortar Color:
 - a. Color: To be selected by Architect.
 - b. Provide limeproof, inorganic compounds which shall not exceed 15% by weight of the cement, unless otherwise directed by manufacturer.
 - c. Aggregate: Provide silica sand as required to adjust color to match sample.
 - d. Carbon black shall not exceed 3% by weight of the cement.
 - e. Factory blend color for full color saturation of mortar joint and factory package for unitized jobsite mixing at a ratio of one unit of color per sack of cementitious material, (Portland cement, lime, or masonry cement).
- B. Sealer: Breather type (non-film forming) masonry sealer approved by simulated stone Manufacturer.

2.6 PROPORTIONING AND MIXING OF BROWN COAT

- A. Accurately measure ingredients. Proportion successive batches exactly alike. Mix aggregate, cement and other dry materials until the mass is uniform in color and homogeneous before adding water. Determine the quantity of water necessary for the desired consistency by trial, and thereafter measure in proper proportions. Retempering will not be allowed.
- B. Mortar for coats shall consist of one volume of Portland cement to not less than three or more than five volumes of damp, loose aggregate.
- C. Hydrated lime, hydrated lime putty, or slaked lime putty may be added as a plasticizing agent, but the amount used shall not exceed 10 percent by weight nor more than 25 percent by volume of the cement used.
- D. Mix materials dry, to uniform color and consistency, before adding water.

2.7 MORTAR MIXES FOR SIMULATED STONE VENEER

- A. Thoroughly mix mortar ingredients in quantities required for immediate use in accordance with ASTM C270, Type N (Type S where approved by manufacturer), and per manufacturer's instructions.
 - 1. Mix color in a specific and exacting ratio in accordance with the Architect's reviewed submittals.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Preconstruction Conference: A conference shall be held at the jobsite prior to start of construction of this portion of the work to review substrates, flashing conditions, work provided by preceding trades and work required by trades following this work. General Contractor, subcontractor(s) affected by the work of this section, Architect and Owner's Representative shall be in attendance. If required, modifications shall be made to details and to specifications to address actual field conditions.
- B. Verification of Conditions:
 - 1. Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect.
 - 2. Failure to observe this requirement constitutes a waiver to subsequent claims to the contrary and holds Contractor responsible for correction(s) Architect may require.
 - 3. Commencement of Work will be construed as acceptance of subsurfaces.
 - 4. Verify, before proceeding with this Work that required inspections of existing conditions have been completed.
- C. Coordination with other Work: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 PREPARATION

- A. Workmanship: Provide Standard Level workmanship as defined by AMG Standard 107.
- B. Protection: Protect sills, ledges, offsets and other projections from dropping of brown coat materials and mortar.

- C. Establish lines, levels, and coursing. Protect from disturbance.
- D. Clean simulated stone prior to erection. Do not use wire brushes or implements which will mark or damage exposed surfaces.

3.3 WEATHER-RESISTIVE BARRIER/LATHING

- A. Weather resistive barrier:
 - 1. Starting at bottom of wall or lowest level, apply weather resistive barrier horizontally in shingle fashion with the upper layer lapped over the lower layer not less than 2 inches. Lap vertical end laps 6 inches minimum
 - 2. Fasten at 12 to 18 inches on center spacing at each vertical stud using the following fasteners:
 - a. Fasten to sheathed wood frame construction with staples, large head nails, or plastic washer nails.
 - 3. Wrap weather-resistive barrier a minimum of 16 inches around all inside and outside corners.
 - 4. Lap upstanding flashing with 4 inch minimum overlap.
 - 5. Completed installation shall be free of holes or breaks.
 - 6. Barrier is not required at CMU walls except at caps, sills and transitions as detailed and as required to maintain waterproof integrity.
- B. Lathing:
 - 1. Sheathed Surfaces: Install lath with the long dimensions of the sheet across supports and attach to thee studs or furring using 18 gage tie wire, or by nailing or by equivalent attachment space at intervals not exceeding 6 inches o.c. vertically and 16 inches o.c. horizontally.
 - a. Make end laps of lath only over supports and stagger endlaps in adjacent courses.
 - b. Wrap metal lath a minimum of 16 inches around all inside and outside corners.
 - 2. Concrete and Masonry Surfaces: No lath is required on clean, new concrete and masonry surfaces.

3.4 BROWN COAT APPLICATION

- A. Apply brown coat with sufficient pressure so that it is forced through the metal reinforcement and against the backing to form full keys and to embed reinforcement completely. Apply to an approximate thickness of 1/4 inch from the face of the backing. Scratch to provide bond for mortar setting of stone.
- B. Temperature shall be 45 degrees F. and rising during application and for 48 hours thereafter.
- C. Allow brown coat to dry overnight before applying simulated stone.

3.5 INSTALLATION

- A. Erect simulated stone in accordance with simulated stone supplier's instructions, erection drawings and as follows.
 - 1. Apply 1/2 to 3/4 inch of mortar to metal lath or prepared and dampened concrete or masonry substrate, covering a maximum of 10 square feet at one time, or less as required to keep mortar workable.
 - 2. Start installation of stone from the bottom up, or as otherwise recommended by the manufacturer.
 - 3. Apply corner unit's first, alternating short and long legs of each course.

4. Press simulated stone units firmly into position in soft mortar bed; joggle each piece slightly to bond firmly, causing mortar to extruded slightly around edges of units. Apply pressure to the stone to ensure a good bond and complete coverage between the mortar bed and back surface of the stone.
 5. As an alternate, the mortar may be applied to the entire back surface of the stone and in lieu of applying mortar to the substrate.
 6. Place units with uniform mortar joints not to exceed 1/2 inch in width.
 7. Neatly tool mortar joint surface to concave, or other profile joint matching approved mock-ups.
 8. Where indicated to be "Dry-Stacked", place units with uniform mortar joints set back from face of stone a minimum of 1 inch to provide "dry stack" appearance.
 9. Point and tool joints before mortar has set.
 10. Colored Mortar: Consistency of appearance shall be maintained throughout the project.
- B. Do not lay chipped, cracked or otherwise defective units in the wall where exposed to view. Units that are cut in field and therefore expose non-integrally colored portions of unit shall not be used and shall be considered defective. Remove and replace units that chipped, cracked, broken, or otherwise defective whether before or after setting.
- C. Openings: Provide openings in simulated stone walls where required or indicated. Steel lintels shall be provided unless otherwise noted.
- D. Cutting of Simulated Stone: Plan work to minimize jobsite cutting. When required, exposed units shall be cut with a power driven Carborundum or diamond disc blade saw to provide uniform edges. When using "wet" cutting methods, clean water shall be used on exposed units. Take care to prevent breaking unit corner or edges.
- E. Where fresh simulated stone joins simulated stone that is partially or totally set, the exposed surface of the set simulated stone shall be cleaned and lightly wetted so as to obtain the best possible bond with the new Work. Loose simulated stone and mortar shall be removed.
- F. Apply sealer to exposed surfaces of simulated stone in accordance with Sealer Manufacturer's printed instructions.
- G. Coordinate sealant application as specified in Section 07900 – Joint Sealants as detailed and as required to maintain waterproof integrity.

3.6 REPAIRS

- A. Remove and replace simulated stone which has cracks, blisters, pitting, discoloration or other defects.
- B. Repairing of defects will be permitted only when approved by the Architect.
- C. Repairs shall match existing work.

3.7 CLEANING

- A. Daily Cleaning: Keep walls clean. Soiled simulated stone from mortar spills which will be exposed to view at the completion of the Project shall be cleaned immediately with stiff fiber brushes until the wall is free of dropped or spattered mortar.
- B. Remove scaffolding and equipment used in the Work.
- C. Clean up debris, refuse and surplus material and remove from premises.

3.8 PROTECTION

- A. Furnish temporary protection for exposed simulated stone corners subject to injury.
- B. Carefully cover tops of walls left incomplete at the conclusion of the day's work with tarpaulins or other approved covering, securely held in place.
- C. In hot and dry weather, protect simulated stone against too rapid drying.
- D. Protect finished work against freezing for a period of not less than 48 hours by means of enclosures, artificial heat, or such other protective methods as may be required.
- E. Allow no construction activity on opposite side of wall to which simulated stone work is being applied during and for 48 hours after completion of work.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Metal fabrications, including items fabricated from iron and steel shapes, plates, bars, strips, tubes, pipes and castings, which are not a part of structural steel or other metal systems specified in other Sections. Types of metal fabrications include, but are not limited to, the following:
1. Steel ladders.
 2. Steel framing and supports for operable partitions.
 3. Steel framing and supports for countertops.
 4. Miscellaneous steel trim.
 5. Miscellaneous framing and supports.
 6. Pipe bollards.
 7. Trash Enclosure gates.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's printed literature for premanufactured items, including fabrication and assembly information.
- B. Shop Drawings: Submit Drawings for the fabrication and erection of items and assemblies not completely shown by the Manufacturer's data sheets.
1. Include plans and elevations at not less than 1/4 inch to 1'-0" scale, and include details of sections and connections at not less than 3/8 inch to 1'-0" scale.
 2. Show anchorage and accessory items.
 3. Provide templates for anchors and bolts specified for installation under other Sections.
 4. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Certificates: Submit copies of certificates for welding procedures and personnel.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with the following, except as otherwise shown and specified:
1. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."
 2. AISI "Specifications for the Design of Cold-Formed Steel Structural Members."

3. ASTM A6 "General Requirements for Rolled Steel Plates Shapes, Sheet Piping and Bars for Structural Use."

B. Welding Standards:

1. Comply with applicable provisions of the following:
 - a. AWS D1.1, "Structural Welding Code--Steel."
 - b. AWS D1.3, "Structural Welding Code--Sheet Steel."
2. Submit certification that each welder has satisfactorily passed AWS qualification tests for types of welding processes involved on project and has performed similar welds during the preceding 6 months.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 METALS

A. General:

1. Exposed Metal: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes

B. Steel:

1. Plates, Shapes, and Bars: ASTM A 36.
2. Tubing: Cold-formed steel tubing complying with ASTM A 500.
3. Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
4. Iron Castings:
 - a. Malleable-Iron Castings: ASTM A 47, Grade 32510.
 - b. Gray-Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.

- C. Ribbed Steel Deck: ASTM A653 steel, 16 gage ribbed deck comparable to Vulcraft Type 3N, with G90 zinc coating.

2.2 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.
- D. Anchor Bolts: ASTM F 1554, Grade 36.
- E. Machine Screws: ASME B18.6.3.
- F. Lag Bolts: ASME B18.2.1.
- G. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
- H. Plain Washers: Round, carbon steel, ASME B18.22.1.
- I. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.
- J. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27 cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153.
- K. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.
- L. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.3 ACCESSORIES

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Primer (shop priming): Provide primers compatible with finish systems specified in Section 09900 – Painting.
 - 1. Interior and enclosed exterior steel: Fast-curing, lead- and chromate-free, universal modified-alkyd primer with rust inhibitors, compatible with finish paint systems indicated.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Series FD88-HS; Tnemec
 - 2) VOC Steel Spec B50NJ1201; Sherwin Williams
 - 2. Exterior Steel (exposed): 2-component, moisture-cured zinc-rich primer conforming to SSPC-PS12.01.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Corothane I Galvapac B65G10/B69D210; Sherwin Williams
 - 2) Tneme-Zinc 90-97; Tnemec Company, Inc.

- C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- D. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Grout: Nonshrink, Nonmetallic, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Metal Bollards:
 - 1. Pipe: Diameter as indicated on Drawings.
 - 2. Concrete: Comply with requirements in Section 03300-Cast-in-Place Concrete for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.4 FABRICATION

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. General:
 - 1. Cut, drill, and punch metals cleanly and accurately.
 - 2. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - 3. Remove sharp or rough areas on exposed surfaces.
 - 4. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
 - 5. Weld corners and seams continuously and in accordance with the recommendations of AWS and to comply with the following:
 - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - b. Obtain fusion without undercut or overlap.
 - c. Remove welding flux immediately.
 - d. Provide for anchorage of type indicated; coordinate with supporting structure.
 - e. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
 - f. Remove sharp or rough areas on exposed traffic surfaces.
 - g. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Exposed Metal:
 - 1. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

2. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous
 3. Finish exposed welds and surfaces smooth with no visible roughness and with contour of welded surface matching that of adjacent surface.
- E. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Carpenter's Iron Work:
1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Manufacture or fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.
- G. Steel Ladders: Fabricate ladders for locations shown, with dimensions, spacings, details, and anchorages as indicated.
1. Comply with ANSI A14.3, unless otherwise indicated.
 2. For elevator pit ladders, comply with ASME A17.1.
 3. Support each ladder at top, bottom and intermediate spaces at a maximum of 60 inches o.c. with welded or bolted steel brackets. Size brackets to support design loads specified in ANSI A14.3.
 4. Provide nonslip surfaces on top of each rung with one of the following:
 - a. Coat each rung with aluminum-oxide granules set in epoxy-resin adhesive
 - b. Use a manufactured rung filled with aluminum-oxide grout.
 - c. Abrasive material metallurgically bonded to rung. Subject to compliance with requirements, provide one of the following:
 - 1) Mebac; IKG Borden.
 - 2) SLIP-NOT; W. S. Molnar Company.
- H. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.
- I. Enclosure Gates: Fabricate to sizes and shapes indicated using galvanized steel tubing and shapes with steel corrugated deck skin as detailed. Fabricate with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
1. Hinges: Provide heavy duty galvanized steel butt hinges sized as required for weight of gate. Weld hinges to frame.
 2. Latching Mechanism: Provide plunger style cane-bolts with pipe receiver set into paving, size as indicated.
- J. Miscellaneous Framing and Supports:
1. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.
 2. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

3. Operable Partitions: Fabricate supports beams from continuous steel shapes of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
4. Galvanize miscellaneous framing and supports where indicated.

K. Miscellaneous Steel Trim:

1. Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible.
2. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.
3. Galvanize exterior miscellaneous steel trim at locations indicated on Drawings.

2.5 FINISHES

A. General:

1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
2. Finish metal fabrications after assembly.

B. Shop Finishing - Ferrous Metals:

1. Priming:
 - a. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Shop prime steel surfaces, except the following:
 - 1) Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2) Surfaces to be field welded.
 - 3) Surfaces to be high-strength bolted with slip-critical connections unless using a primer approved for slip-critical conditions and as approved by Structural Engineer.
 - 4) Galvanized surfaces.
 - b. Surface Preparation: Remove loose rust, loose mill scale, and spatter, slag, or flux deposits before shop coat of paint is applied. Remove oil, grease and similar contaminants in accordance with SSPC SP-1. Clean surfaces as required by primer manufacture and as follows:
 - 1) Exterior and Interior Architectural Exposed: SSPC SP-6
 - 2) Interior (concealed): SSPC SP-2 or SSPC SP-1.
 - c. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and to provide a uniform dry film thickness required by manufacturer. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - d. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - e. Apply 2 coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
 - f. Paint erection marks on painted surfaces. Touch-up surfaces where welding, grinding of welds, joints, etc. are done in the field.
 - g. Paint shall be thoroughly dry before members are handled.
 - h. Surfaces shall receive paint finish as specified in Section 09900 - Painting.
2. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
 - a. ASTM A 123, for galvanizing steel and iron products.
 - b. ASTM A 153, for galvanizing steel and iron hardware.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates to appropriate Trades.
- C. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.3 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

- G. Miscellaneous Framing and Supports:
 - 1. Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- H. Pipe Bollards:
 - 1. Anchor bollards in place with concrete footings. Center and align bollards in holes a minimum of 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
 - 2. Fill bollards solidly with concrete, mounding top surface.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide the minimum dry film thickness recommended by paint manufacturer.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.5 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch

3.6 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Beams, girders, and purlins.
 2. Columns and posts.
 3. Plywood Sheathing.
 4. Accessories required for a complete installation.

1.2 SUBMITTALS

- A. Product Data:
1. Manufacturer's data for wood-preservative treatment and certification by treating plant that treated materials comply with requirements.
 2. Manufacturer's data for fire-retardant treatment and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
 3. Submit copies of warranties from chemical treatment manufacturers for each type of treatment.

1.3 QUALITY ASSURANCE

- A. Source Limitations for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.
- B. Standards:
1. Grading: Conform with applicable requirements of DOC PS 20, *American Softwood Lumber Standard*, by the American Lumber Standards Committee (ALSC), the National Grading Rule for Dimensional Lumber and to grading rules of manufacturer's association under whose rules the lumber is produced.
 2. Preservative Treatment: Applicable standards of the American Wood Preservers Association.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.
- B. Storing: Stack lumber; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements: Store materials for which a maximum moisture is specified in areas where humidity can be controlled.

PART 2 - PRODUCTS

2.1 HEAVY TIMBER

- A. Comply with DOC PS 20, *American Softwood Lumber Standard*, and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
 - 1. NELMA - Northeastern Lumber Manufacturers Association.
 - 2. NHLA - National Hardwood Lumber Association.
 - 3. NLGA - National Lumber Grades Authority (Canada).
 - 4. RIS - Redwood Inspection Service.
 - 5. SPIB - Southern Pine Inspection Bureau.
 - 6. WCLIB - West Coast Lumber Inspection Bureau.
 - 7. WWPA - Western Wood Products Association.
- C. Grade Stamps: Provide heavy timber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, species, grade, moisture content at time of surfacing, and mill.
- D. Preservative Treatment: Pressure treat heavy timber with waterborne solution to comply with AWWPA C2 for aboveground use.
 - 1. After treatment, redry heavy timber to 19 percent maximum moisture content.
 - 2. Use preservative solution with water repellent additive.
 - 3. Use preservative solution without water repellents or other substances that might interfere with application of indicated finishes.
 - 4. Do not use chemicals containing arsenic or chromium.

2.2 SHEET PRODUCTS

- A. General:
 - 1. Comply with "Code Plus" provisions in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."
 - 2. Factory mark panels according to indicated standard.
- B. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated. Each panel of softwood plywood shall be identified with the APA grade-trademark and shall meet the requirements of PS-1-83 for softwood plywood and General Structural Notes and Drawings.
- C. Oriented Strand Board: DOC PS 2.
 - 1. Raw materials used in panel shall be manufactured from wood products conforming to ANSI A201.1.
 - 2. Each piece shall be stamped in accordance with American Plywood Associations (APA) grade rules and shall meet requirements of latest edition of U.S. Product standard for Softwood Plywood.
 - 3. Provide Grade 2-M-W or 2-M-F as required for thickness and application.
 - 4. Rating: Exposure 1, or Exterior sheathing.
 - 5. The use of OSB shall be approved by Structural Engineer and roofing system manufacturer.
- D. Thickness: As needed to comply with requirements specified but not less than thickness indicated on Drawings.

- E. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, 15/16 inches thick unless otherwise indicated.

2.3 FABRICATION

- A. Camber: Fabricate horizontal and inclined members, units of less than 1:1 slope, with natural convex bow (crown) up, to provide camber.
- B. Shop fabricates members by cutting and restoring exposed surfaces to match specified surfacing. Predrill for fasteners and assembly of units.
 - 1. Machine sand exposed surfaces to remove planing or surfacing marks, finishing with No. 120 grit sandpaper.
 - 2. Where treated timber is indicated, fabricate members (cutting, drilling, surfacing, and sanding) before treatment to the greatest extent possible. Where fabrication must be done after treatment, apply field treatment preservative to comply with AWPA M4.
- C. Seal Coat: After fabricating and surfacing each unit, apply saturation coat of penetrating sealer on surfaces of each unit, except for treated wood where the treatment included water repellent.

2.4 FACTORY TREATMENT MATERIALS

- A. Preservative Treatment: AWPA C2 (lumber) and AWPA C9 (plywood)
 - 1. Materials:
 - a. Provide ammoniacal copper quaternary (ACQ) or copper boron azole (CBA).
 - b. Chromated copper arsenate (CCA) is not allowed.
 - 2. Locations:
 - a. Wood members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete, located at or below grade.
 - c. Other locations as required by Code.
- B. Fire Retardant Treatment: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.
 - 2. Use treatment that does not promote corrosion of metal fasteners.
 - 3. Chemicals shall comply with FR-1 or AWPA Standard P17 and shall be free of halogens, sulfates and ammonium phosphate.
 - 4. Acceptable Product: Dricon FRTW as manufactured by Hickson Corp.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in contact with ground, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153.
 - 2. Fasteners in contact with wood that has been pressure-preservative treated shall be hot dip zinc coated complying with ASTM A 153, or stainless steel complying with ASTM F 593 and ASTM F 594.

- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Screws:
 - 1. Wood: ASME B18.6.1.
 - 2. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- E. Lag Bolts: ASME B18.2.1.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
- H. Metal Framing Anchors: Made from hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 (Z180) coating designation.
 - 1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
 - 2. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

PART 3 - EXECUTION

3.1 FRAMING INSTALLATION

- A. General:
 - 1. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
 - 2. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
 - 3. Structural Members: No cutting, notching or drilling without prior approval of the Structural Engineer through the Architect. Do not splice structural members between supports.
 - 4. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
 - 5. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

6. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - a. CABO NER-272 for power-driven fasteners.
 - b. Published requirements of metal framing anchor manufacturer.
 - c. Table 2304.1 of the 2000 International Building Code.
 - d. General Structural Notes and Drawings.

- B. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

- C. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

- D. Connections: Subdrill where necessary to avoid splitting.

- E. Bolts: Drill bolt holes 1/32 inch larger than bolt diameter. Use square plate or malleable iron washers under heads and nut where they bear against wood. Re-tighten bolts immediately prior to concealing with finish materials. Re-tighten exposed bolts immediately prior to final inspection by Building Official.

- F. Lag Screws and Screws: Subdrill, use square plate or malleable iron washer under lag screw heads when they bear on wood.

- G. Exterior base plates or sills resting on concrete: Bed in cement mortar to obtain a continuous bearing. Mortar shall consist of one part cement to three parts sand. Mix mortar in small quantities so that it can be used promptly. Size plates or sills and set level and true to line. Bolt down with bolts of size, length and spacing indicated with a bolt not more than 9 inches from the end of any piece.

- H. Backing, Furring, Stripping and Blocking: Install where indicated and where required for installation and attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
 1. Provide fire-proofed wood backing approved by Building Official where required by Code in noncombustible or fire-rated construction.
 2. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Where possible, secure anchor bolts to formwork before concrete placement.
 3. Blocking:
 - a. Provide continuous horizontal blocking, using members of 2-inch nominal thickness and of same width studs, as follows
 - 1) Stud partitions or walls more than 8 feet but less than 14 feet in height: One row of blocking fitted snugly and nailed into mid-height of stud.
 - 2) Walls or partitions over 14 feet in height: 2 or more rows of blocking. Locate rows of blocking so that in no case will the distance between sole or top plates and blocking or between lines of blocking exceed 8 feet.
 - b. Fire block concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where fire blocking is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal-thick lumber of same width as framing members.
 4. Furring: Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
 - a. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - b. Furring shall extend the full width and from floor to roof or ceiling joists.

- I. Wall and Partition Framing: Arrange studs so wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Anchor or nail plates to supporting construction, unless otherwise indicated.
 1. Construct corners and intersections with 3 or more studs.
 2. Openings: Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
 - a. Non-load-bearing partitions: Provide double-jamb studs with headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
 - b. Load-bearing walls: Provide double-jamb studs for openings 72 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.
 3. Provide bracing in walls, at locations indicated and as required by local code, unless otherwise indicated.

- J. Where built-up beams or girders of 2-inch nominal- dimension lumber on edge are required, fasten together with 2 rows of 20d nails spaced not less than 32 inches o.c. Locate one row near top edge and other near bottom edge.

3.2 SHEATHING INSTALLATION

- A. General: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
 1. Comply with "Code Plus" provisions in above-referenced guide.
 2. Install with the "C" or best face on exposed side.
 3. Install roof sheathing with long dimension perpendicular to joints.
 4. Sheathing shall have edges blocked and nailed for diaphragm or shear wall stresses as shown on the Drawings.

- B. Fastening Methods: Fasten panels as indicated below:
 1. Sheathing:
 - a. Nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch apart at edges and ends.

3.3 PLYWOOD BACKING PANELS

- A. Plywood Backing Panels: Install with the "C" or best face on exposed side.

3.4 CLEANING

- A. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION

SECTION 06175

WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Prefabricated wood trusses and truss accessories.

1.2 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
1. NELMA - Northeastern Lumber Manufacturers Association.
 2. NLGA - National Lumber Grades Authority.
 3. SPIB - Southern Pine Inspection Bureau.
 4. WCLIB - West Coast Lumber Inspection Bureau.
 5. WWPA - Western Wood Products Association.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's data for metal-plate connectors, metal framing anchors, bolts, and fasteners.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material. Include manufacturer's standard warranty.
- B. Shop Drawings: Include the following information:
1. Structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 2. Location, pitch, span, camber, configuration, and spacing for each type of truss required
 3. Species, sizes, and stress grades of lumber
 4. Splice details
 5. Type, size, material, finish, design values, orientation, and location of metal connector plates
 6. Bearing details.

1.4 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: Manufacturer shall be a member of TPI and comply with TPI quality-control procedures for manufacture of connector plates published in TPI 1.
1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

- B. Source Limitations for Connector Plates: Obtain metal connector plates through one source from a single manufacturer.
- C. Comply with applicable requirements and recommendations of the following publications:
 - 1. TP1 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
 - 2. TPI DSB "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
 - 3. TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."
- D. Wood Structural Design Standard: Comply with applicable requirements in AFPA's "National Design Specifications for Wood Construction" and it's "Supplement."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handling: handle fabricated trusses in accordance with TPI recommendations. Provide adequate distribution of concentrated loads so that the carrying capacity of any one truss is not exceeded.
- B. Storage: Set trusses in vertical positions and rest upon temporary bearing supports and brace so that they are not subject to unusual bending or tip-over.
- C. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.6 COORDINATION

- A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying progress of other trades whose work must follow erection of trusses.

PART 2 - PRODUCTS

2.1 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Provide dressed lumber, S4S, manufactured to actual sizes required by DOC PS 20 for moisture content specified.
 - 3. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
- B. Grade and Species: Provide visually graded dimension lumber for truss chord and web members, of the following grade and one of the following species:
 - 1. Grade for Chord Members: Select Structural, No. 1 or No. 2.
 - 2. Grade for Web Members: No. 2, Stud or No. 3, same grade as indicated for chord members.
 - 3. Species: Douglas fir-larch or Hem-fir.
 - a. Trusses scheduled to remain exposed in final work: Verify species with Architect prior to commencing work.

2.2 FIRE-RETARDANT-TREATED WOOD

- A. General: Where fire-retardant-treated wood is indicated, provide wood that complies with performance requirements in AWPA C20. Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664.
 2. Use treatment that does not promote corrosion of metal fasteners.
 3. Use Exterior type for exterior locations and where indicated.
 4. Use Interior Type A High Temperature (HT), unless otherwise indicated.
- B. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

2.3 ACCESSORIES

- A. Connectors: Fabricate connector plates to comply with TPI 1, hot-dip galvanized steel sheet, ASTM A 653, G60 coating designation; Designation SS, Grade 33, and not less than 0.036 inch thick.
- B. Fasteners:
1. Nails, Wire, Brads, and Staples: FS FF-N-105.
 2. Standard in first paragraph below covers power-driven staples, nails, P-nails, and allied fasteners.
 3. Power-Driven Fasteners: CABO NER-272.
 4. Wood Screws: ASME B18.6.1.
 5. Lag Bolts: ASME B18.2.1.
 6. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
 7. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - a. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
- C. Metal Framing Anchors:
1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
 2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
 3. Materials:
 - a. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation.
 4. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick.

5. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

D. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

2.4 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. Before installing, splice trusses delivered to Project site in more than one piece.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated on Drawings.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses at spacing indicated on Drawings; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchor according to manufacturer's fastening schedules and written instructions.

H. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

I. Install wood trusses within installation tolerances in TPI 1

J. Do not cut or remove truss members.

K. Do not alter trusses in field. Replace wood trusses that are damaged or do not meet requirements.

3.2 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

END OF SECTION

SECTION 06180

GLUED-LAMINATED MEMBERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Glued-Laminated Beams.

1.2 SUBMITTALS

- A. Product Data: Submit data for glulam timber and accessories. Include installation instructions and data on lumber, adhesives, fabrication, treatment, and protection.
- B. Shop Drawings: Show layout of structural glulam timber system and full dimensions of each member. Indicate species and laminating combination, adhesive type, and other variables in required Work.
1. For installed structural glulam timber indicated to comply with certain design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples: Full width and depth, 24 inches long, showing the range of variation to be expected in appearance of structural glulam timber including treatment and finishing.
1. Apply specified finish to 3 sides of half-length of each sample.
- D. Certificates of Conformance: Issued by a qualified inspection and testing agency indicating that glulam timbers comply with requirements of AITC A190.1.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.3 QUALITY ASSURANCE

- A. Qualifications:
1. Installer Qualifications: Installer shall have a minimum of 5 years experience with glulam timber construction similar in material, design, and extent to that indicated for this Project.
 2. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in Arizona and who is experienced in providing engineering services of kind indicated.
 3. Manufacturer Qualifications: Provide factory-glued structural units produced by an AITC-licensed firm. Factory mark each piece of structural glulam timber with AITC Quality Mark. Place mark on surfaces that will not be exposed in completed Work.
- B. Standard: Comply with AITC A190.1, "Structural Glued Laminated Timber."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with provisions of AITC 111, "Recommended Practice for Protection of Structural Glued Laminated Timber during Transit, Storage, and Erection."

- B. Store members on supports not less than 12 inches above ground or 1-1/2 inches above subfloors, as applicable.
- C. Individually wrap members with plastic-coated paper covering, with water-resistant seams, before shipping or exposing to outdoor conditions.
- D. Protect members during unloading, hauling and erection. Field-trimmed ends or surfaces shall receive a coat of penetrating type sealer prior to erection.

PART 2 - PRODUCTS

2.1 GLULAM TIMBER

- A. Structural Glulam Timber:
 - 1. Species and Grades for Lumber for laminating shall be any species listed in AITC 117—MANUFACTURING.
 - 2. Moisture Content: At time of gluing, moisture content of lumber shall not be less than 7 percent and shall not exceed 11 percent. The range of moisture content of various laminations assembled into a single member shall not exceed 5 percent.
- B. Appearance Grade:
 - 1. Concealed Locations: Provide Industrial appearance grade members complying with AITC 110
- C. Adhesive: Wet-use type complying with ASTM D 2559.
 - 1. Do not use melamine-urea-formaldehyde adhesives for preservative-treated structural glulam timber.
- D. Sealers:
 - 1. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
 - 2. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.
- E. Connectors, Anchors, and Accessories: Fabricate from structural-steel shapes, plates, and bars complying with ASTM A 36; steel bars complying with ASTM A 575, Grade M 1020; and hot-rolled steel sheet complying with ASTM A 570, Grade 33.
 - 1. Finish: Hot-dip galvanize each assembly and fastener after fabrication to comply with ASTM A 123 or ASTM A 153.

2.2 FABRICATION

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.
- B. Laminations shall be machine finished, but not sanded, to a smooth finish and to a uniform thickness with a maximum allowable variation of 1/64 inch.
- C. Warp, twist or other characteristics which prevent contact of adjacent glued faces or interfere with uniform bending when under clamping pressure not permitted. Surfaces to be glued shall be clean and free from oil, dust and other foreign material detrimental to gluing.

- D. Identification: Each completed member shall bear a specific identification, for location and shall be accompanied by an AITC Inspection Certificate provided by the fabricator.
- E. Camber: Fabricate horizontal and inclined members, units of less than 1:1 slope, with either circular or parabolic camber equal to 1/500 of span.
- F. End-Cut Sealing: Immediately after end-cutting each member to final length and after wood treatment (if any), apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood-coated for not less than 10 minutes.
- G. Seal Coat: After fabricating and sanding each unit, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit, except for treated wood where treatment included a water repellent.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Erect structural glulam timber framing true and plumb, with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
 - 1. Use padded slings and protect corners with wood blocking.
- B. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.
 - 1. Where treated members must be cut during erection, apply a field-treatment preservative to comply with AWWA M4.
- C. Install steel connectors, anchors, and accessories as indicated.

3.2 ADJUSTING AND CLEANING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glulam timber if repairs are not approved by Architect.

3.3 PROTECTION

- A. Keep wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, soiling, and damage from work of other trades.
 - 1. Coordinate wrapping removal with finishing work specified in applicable Division 9 sections. Retain wrapping where it can serve as a painting shield.

END OF SECTION

SECTION 06400

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Plastic-laminate cabinets
 2. Solid surface countertops.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for each type of product indicated, including cabinet hardware and accessories, and finishing materials and processes.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 2. Show locations and sizes of cutouts and holes penetrations through installed architectural woodwork.
- C. Samples:
1. Plastic laminate and solid surfacing: Submit 2 samples, manufacturer's standard size, for each type, color, pattern, and surface finish.
- D. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.
1. Provide AWI Quality Certification Program labels indicating that woodwork complies with requirements of grades specified.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork 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.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Sheet Products:
 - 1. Hardboard: AHA A135.4.
 - 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD Provide Grade MD-Exterior Glue at locations subject to moisture or exterior conditions.
 - 3. Particleboard: ANSI A208.1, Grade MD. Provide Grade MD-Exterior Glue at locations subject to moisture or exterior conditions. Provide sanded faces for drawer and shelving construction.
 - 4. Softwood Plywood: DOC PS 1, Douglas Fir face species, rotary cut, exterior glue, sanded finish Provide marine grade at locations subject to moisture.
 - 5. Hardwood Plywood and Face Veneers: HPVA HP-1.
 - 6. Thermoset Decorative Overlay (melamine): Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
 - a. Color: As indicated on Finish Schedule.

2.2 LAMINATE MATERIALS

- A. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
1. Formica Corporation.
 2. Laminart.
 3. Nevamar
 4. Pionite.
 5. Wilsonart International; Div. of Premark International, Inc.
- B. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
1. High-Pressure Decorative Laminate Grade:
 - a. Flat: HGS.
 - b. Postformed: HGP
 2. Vertical Surfaces: VGS (0.028 inch thick).
 3. Edges: HGS (0.048 inch thick).
 4. Backer: NEMA LD-3, Grade BK-20 (.020 inch thickness).
 5. Colors, Patterns and Finishes: As indicated on Finish Schedule.
- C. Adhesive for Bonding Plastic Laminate: As recommended by plastic laminate manufacturer to suit application.

2.3 SOLID SURFACING MATERIALS

- A. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with material and performance requirements in ANSI Z124.3, for Type 5 or Type 6, without a precoated finish.
1. Thickness: As indicated on Drawings.
 2. Colors, Patterns, and Finishes: As selected by Architect.
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avonite; Avonite, Inc.
 - b. Corian; DuPont Polymers.
 - c. Surell; Formica Corporation.
 - d. Fountainhead; International Paper, Decorative Products Div.
 - e. Gibraltar, Wilsonart International

2.4 CABINET HARDWARE AND ACCESSORIES

- A. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening.
- C. Wire Pulls: Back mounted, 4 inches long, 5/16 inches in diameter
- D. Catches: Push-in magnetic catches, BHMA A156.9, B03131.
- E. Shelf Rests: BHMA A156.9, B04013.
- F. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads:
1. Box Drawer Slides: 75 lbf.

2. File Drawer Slides: 150 lbf.
3. Pencil Drawer Slides: 45 lbf.

- G. Exposed Hardware Finishes: As selected by Architect.
- H. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.5 ACCESSORIES

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, fire-retardant-treated as required, 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 nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.6 FABRICATION - GENERAL

- A. Interior Woodwork Grade: Provide Custom grade interior woodwork complying with the referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
 2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
 3. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch.
- D. 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.
- E. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, 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.
1. Seal edges of openings in countertops with a coat of varnish.

2.7 CABINETS AND COUNTERTOPS

- A. Quality Standard: Comply with AWI Section 400 requirements for wood cabinets.
- B. AWI Type of Cabinet Construction: Flush overlay.
- C. Semiexposed Surfaces: Thermoset decorative overlay

2.8 WOOD CABINETS

- A. Door and Drawer Fronts: Style as selected by Architect.
- B. Plastic Laminate Cabinets:
 - 1. Semi-exposed Surfaces (Interior surfaces of plastic laminate casework): Melamine, thermally fused, unless otherwise indicated on Drawings.
 - 2. Plastic Laminate Cabinets: Plastic laminate faced with integral post formed back splashes and separate side splashes with integral scribe for fitting to wall and back splash.
 - 3. Cap exposed edges of plastic laminate casework with matching plastic laminate edge banding laminated to edge as indicated on the Drawings. Use one piece for full length only.
- C. Shelves: Fabricate shelves with 3/4 inch thick wood particleboard cores unless otherwise indicated.
 - 1. Laminate, Shelves within Casework: Melamine, thermally fused, PVC edge banding at all adjustable shelf edges, unless otherwise indicated.
 - 2. Shelf Standards within Casework: Set shelf standards within recessed groove of same depth as shelf standard.
- D. Solid Surface Countertops:
 - 1. Quality Standard: Comply with AWI Section 400 requirements for countertops.
 - 2. Grade: Custom.
 - 3. Fabricate tops in one piece with shop-applied backsplashes and edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
 - 4. Install integral sink bowls in countertops in shop.
 - 5. Drill holes in countertops for plumbing fittings and soap dispensers in shop.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700.
- B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
- C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

- 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 sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with appropriate fasteners.

- F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - 2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 - 3. Calk space between backsplash and wall with sealant specified in Section 07900 - Joint Sealants.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

- B. Clean, lubricate, and adjust hardware.

- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 06670

FIBERGLASS REINFORCED PLASTIC (FRP) PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Fiberglass-reinforced plastic panels as indicated on Drawings and as specified herein.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's Specifications and installation instructions for each material and accessory.
- B. Submit Manufacturer's full range of color and pattern samples of wall panels and trim pieces for Architect's selection. Submit two samples of selected products.
- C. Submit cleaning and maintenance instructions.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials clearly labeled to identify Manufacturer, brand name, quality or grade and fire hazard classification.
- B. Store horizontally in original undamaged packages.

1.4 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: Install materials when temperature and humidity conditions approximate conditions that will exist when building is occupied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products as manufactured by one of the following:
 1. Kemlite Company
 2. Marlite

2.2 MATERIALS

- A. Panels and Accessories:
 1. Fiberglass reinforced plastic; 0.09 inches thick laminated to one side of a 1/2 inch thick APA, CD Exposure 1 grade plywood or moisture resistant gypsum board.
 2. Panels shall be USDA approved for incidental food contact.
 3. Fasteners to be Manufacturer's standard nylon drive pins.
 4. Texture: Pebbled.
 5. Color: White
- B. Adhesive: Manufacturer's recommended type for use with selected materials, waterproof, mildew resistant nonstaining type.

- C. Caulking: Latex type as approved by Adhesive and Wall Paneling Manufacturer.
- D. Moldings: Extruded polyvinyl chloride (PVC), color to match panel. Moldings at panel edges to be 2 piece batten type with snap-on trim.
- E. Miscellaneous Items: Furnish and install supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation whether or not specified or indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 - 1. Examine substrate and conditions under which the material is to be installed.
 - 2. Verify that surfaces, when tested with moisture meter, have proper moisture content.
 - 3. Verify that nails and screws are recessed, with joints and depressions taped, finish and sealed.
 - 4. Remove contaminants from areas to be covered.
 - 5. Do not proceed with Work until Work of other Trades which passes through wall covering has been completed and unsatisfactory conditions have been corrected.
 - 6. Start of Work indicates acceptance of responsibility for performance and any required remedial Work.

3.2 INSTALLATION

- A. Install panels in accordance with Manufacturer's printed instructions using full sheet mastic coverage method plus nylon fasteners.
- B. Make joints with 1/8 inch space for expansion and use moldings designed for each condition for the Project.
- C. Bevel back edges of panels with block plane to permit proper fit into moldings.
- D. If one end of panel must be nailed, do not nail the other end.
- E. Remove plumbing escutcheons, switchplates, wall plates, and surface-mounted fixtures, and cut wall paneling evenly to fit. Replace items after completion of Work.
- F. Where applicable, install paneling before installation of plumbing, casings, bases, cabinets and other items to be applied over paneling.

3.3 CLEANING

- A. Remove excess adhesive and smudges with soft cloth and mineral spirits.

END OF SECTION

SECTION 07210
BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Interior batt insulation.

1.2 SUBMITTALS

- A. Product Data: Submit Manufacturer's data, installation instructions, limitations and recommendations. Include certification and test data substantiating R-Values and combustibility of each type of insulation.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide insulation and related materials with fire-test-response characteristics as required by code, as determined by testing identical products per ASTM E 84 for surface-burning characteristics, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Johns-Manville
 2. Owens-Corning Fiberglas Corp.
 3. Certainteed

2.2 INSULATING MATERIALS

- A. Glass fiber batts: Batts shall be a single thickness to meet the required R-value.
1. Unfaced Mineral-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
 2. R-Values:
 - a. Walls: R-19.
- B. Fire Safing Insulation: As specified in Section 07840 – Through Penetration Firestop Systems.
- C. Acoustical Batt Insulation: As specified in Section 09820 – Acoustical Insulation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

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

3.2 INSTALLATION

- A. General:
 1. Do not install insulation until the Construction has progressed to the point that inclement weather will not damage or wet the insulation material.
 2. Install insulation to comply with insulation manufacturer's written instructions applicable to products and application indicated.
 3. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
 4. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant.
 5. Install materials in a manner that will maximize continuity of thermal envelope. Use a single layer of insulation wherever possible to achieve indicated requirements, unless otherwise indicated.
 6. Cut and fit tightly around obstructions and fill voids with insulation.
 7. Remove projections that interfere with placement.
- B. Batt Insulation: Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Wood-framed construction: Install mineral-fiber blankets according to ASTM C 1320.

3.3 CLEANING

- A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.
- B. Protection: Take precautions to protect insulation, both during and after installation, from damage of any kind until covered.

END OF SECTION

SECTION 07320

ROOF TILES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Roof tiles
 - 2. Underlayment
 - 3. Accessories required for complete installation.

- B. Related Sections:
 - 1. Section 06100 - Rough Carpentry: Sheathing; roof deck; and wood battens, nailing strips, and framing.
 - 2. Section 07600 - Sheet Metal Flashing and Trim: Gutters, downspouts, flashing, and other sheet metal work not included in this Section.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for each type of product specified, including details of construction and installation, dimensions of individual components, profiles, textures, and colors.

- B. Samples: Full-size units of each type of roof tile indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

1.3 QUALITY ASSURANCE

- A. Qualifications: Work shall be performed by applicator approved by the manufacturer.

- B. Perform work in conformance with the latest edition of the National Roofing Contractors Association (NRCA), Steep Roofing Manual.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's unopened bundles or containers with labels intact.

- B. Handle and store materials at Project site to prevent water damage, staining, or other physical damage. Store rolls goods on end. Comply with manufacturer's written instructions for Project site storage, handling, and protection.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with roof tile Work only when existing and forecasted weather conditions permit Work to be installed according to manufacturer's written instructions and when substrate is completely dry.

1.6 WARRANTY

- A. Warranty: Submit a written warranty, executed by manufacturer, agreeing to repair or replace roof tiles that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, deformation or deterioration of roof tiles beyond normal weathering.
1. Warranty Period: 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
1. MonierLifetile Corp.
 2. Hanson.

2.2 ROOF TILES

- A. Concrete Tile: Molded- or extruded-concrete roof tile units of shape and configuration indicated, with integral color, and free from surface imperfections. Include specially shaped, color-matched units as indicated or required for eaves, rakes, ridges, hips, valleys, and other conditions. Provide with fastening holes predrilled when manufactured.
1. Type: To be determined.
 2. Colors, Blends, and Patterns: To be determined.

2.3 UNDERLAYMENT

- A. Felt Underlayment: No. 30, unperforated organic felt, complying with ASTM D 226, Type II, 36 inches wide.
1. Provide 2 layers.

2.4 SHEET METAL FLASHING

- A. Metals: Provide flashing fabricated from the following materials:
1. Galvanized Steel Sheet: ASTM A 653, G90 coating designation; commercial or lock-forming quality; 24 gauge minimum, unless otherwise indicated.
- B. Fabricate sheet metal flashing to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metals, and other characteristics of item indicated.

2.5 FASTENERS

- A. Nails: Aluminum or hot-dip galvanized steel, 0.1055-inch- diameter shank, sharp-pointed, conventional roofing nails with barbed shanks, minimum 3/8-inch- diameter head, and of sufficient length to penetrate either 3/4 inch into battens, or solid decking or through plywood sheathing. Matches nail materials with flashing materials to prevent galvanic action.
- B. Wood Batten Nails: ASTM F 1667, common or box, steel wire, flat head, and smooth shank.
- C. Tile Vents and Eave Closures: Manufacturer's recommended noncorroding screen vents and solid eave closures as required for application.

2.6 ACCESSORIES

- A. Asphalt Plastic Cement: Nonasbestos-fibrated asphalt cement complying with ASTM D 4586, designed for trowel application.
- B. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of felt underlayment, free of asbestos and toxic solvents.
- C. Mortar:
 - 1. Materials for mortar preparation:
 - a. Portland Cement: ASTM C 150, Type I.
 - b. Masonry Cement: ASTM C 91, Type N.
 - c. Aggregate: ASTM C 144.
 - d. Mortar Pigment: Natural and synthetic iron oxides and chromium oxides.
 - e. Water: Potable.
 - 2. Mix according to ASTM C 270, proportions for Type M mortar. Include colored pigment to produce mortar matching the color of tile selected.
- D. Battens: Nominal 1 inch to 2 inch softwood lumber boards, as approved by local authorities.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for substrates, installation tolerances, and other conditions affecting performance of Work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected. Verify the following:
 - 1. Roof penetrations are in place and flashed to deck surface.
 - 2. Roof openings are correctly framed prior to installing work of this Section.
 - 3. Deck is of sufficient thickness to accept fasteners
 - 4. Deck surfaces are dry, unfrozen, and free of ridges, warps, or voids.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with noncorrosive roofing nails.
- B. Coordinate installation with flashing, gutters, and other adjoining work to ensure proper sequencing. Do not install roofing materials until all vent stacks and other penetrations through roof have been installed and are securely fastened against movement.

3.3 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Apply one layer of felt underlayment horizontally over entire surface to receive roof tile, lapping succeeding courses a minimum of 2 inches, ends a minimum of 4 inches, and hips and valleys a minimum of 6 inches. Fasten felt with a sufficient number of roofing nails or noncorrosive staples to hold underlayment in place until roof tiles are applied.
 - 1. Provide second layer of felt underlayment over first layer, staggering laps a minimum of 8 inches.
 - 2. Where clay tile is not installed immediately after installation of underlayment, install protective sheet over underlayment to protect against UV and head degradation as recommended by underlayment manufacturer.

3.4 BATTEN INSTALLATION

- A. Snap chalk lines parallel to eave line. Set out as recommended by tile manufacturer.
- B. Fix battens to conform to chalk lines securing to deck at no more than 24 inches on center using recommended fasteners.
- C. Battens shall be installed to provide drainage past or beneath battens at a maximum of 4 foot intervals as recommended by tile manufacturer.

3.5 TILE INSTALLATION

- A. Comply with manufacturer's written installation instructions and recommendations, but not less than those recommended by NRCA's "The NRCA Roofing and Waterproofing Manual": Section "The NRCA Steep Roofing Manual."
- B. Roof Tile Installation: Beginning at eaves, install roof tiles according to manufacturer's written instructions and with details and recommendations of NRCA's "The NRCA Roofing and Waterproofing Manual": Section "The NRCA Steep Roofing Manual." Unless otherwise indicated, provide minimum 3-inch lap between succeeding courses of tile. Drive nails to clear the tile so the tile hangs from the nail and is not drawn up.
 - 1. Install with color blend approved by Architect. Install matching, specially shaped units at ridges, rakes, and hips.
 - 2. Set ridge and hip tile in a full bed of mortar and strike mortar flush with face of ridge or hip cover tile.
 - 3. Cut tile at valleys to form a straight border. Taper valleys from a 2-inch exposure on each side of valley at top and increase exposure by 1 inch on each side per 96 inches of valley length.
 - 4. Cut and fit tile at roof vents and other roof penetrations. After tiles are laid, fill voids with mortar.
- C. Installation of Accessories: Install eave closures, wind locks, snow guards, hurricane clips, tile vents, closures, and other accessories with roof tile installation and according to manufacturer's written installation instructions and specified requirements.
- D. Flashing: Install metal flashing as indicated and according to details and specified requirements.
 - 1. Where flashings occur perpendicular to slope, return sheet metal at least 3 inches under tile and turn metal up at least 2 inches.
 - 2. Fabricate metal flashings at open valleys with a minimum 1-inch- high standing rib at center of valley to break force of water flow. Extend metal flashing a minimum of 12 inches onto roof deck on each side of valley.
 - 3. If valley length exceeds 12 feet, increase width of valley flashing by 1 inch on each side per 96 inches of valley length.

3.6 ADJUSTING

- A. Replace damaged materials specified in this Section with new materials that meet requirements.

3.7 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

3.8 PROTECTION

- A. Construction Traffic: . Protect materials and take precautions to prevent other trades from damaging roof during and after construction. Repair torn or punctured materials before roofing over. Use runways over materials in place.

- B. Waterstopping: At the end of each day's work, the work performed during that day shall be sealed at the edges and well covered to prevent moisture from entering under the material. Contractor shall take necessary precautions during installation to insure that moisture from inclement weather shall be prevented from entering the building where interior finishes are in place and/or building is occupied.

END OF SECTION

SECTION 07600

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Roof flashing and trim.

1.2 SUBMITTALS

- A. Shop Drawings: Show layouts, profiles, shapes, seams, dimensions, and details for fastening, joining, supporting, and anchoring sheet metal flashing and trim. Include provisions for expansion and contraction.
- B. Samples: Submit 12 inch x 12 inch sample for each type of exposed finish required.

1.3 QUALITY ASSURANCE

- A. Standards:
1. Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
 2. Comply with The NRCA Roofing and Waterproofing Manual installation details.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation, metallic coated by the hot-dip process, structural quality, 24 gage minimum.

2.2 ACCESSORIES

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Felt Underlayment: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.
- C. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws. Provide fasteners designed to withstand design loads.
1. Galvanized Steel: Pre-finished galvanized steel with soft neoprene washers at exposed fasteners.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- E. Elastomeric Sealant: As specified in Section 07900 – Joint Sealant.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound.

- G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat.
- H. Solder: ASTM B32, 50/50 type.
- I. Flux: FS O-F-506.
- J. Polyethylene: Black, 6 mil.

2.3 FABRICATION

- A. General:
 - 1. Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricates items where practicable. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 3. Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.
 - 4. Seams: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 5. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
 - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal, and in thickness not less than that of metal being secured.

2.4 FINISH

- A. Shops prepare and prime exposed ferrous metal surfaces.
- B. Backpaint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 1.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
 - 1. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
 - 2. Verify membrane termination and base flashings are in place, sealed, and secure.
- B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION - GENERAL

- A. General:
 - 1. Conform to NRCA and SMACNA Manuals.

2. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - a. Torch cutting of sheet metal flashing and trim is not permitted.
 3. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 4. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 5. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - a. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show in finished Work.
1. Assemble parts and solder using regular non-corrosive resin flux. Heat metal thoroughly to completely sweat solder through full contact area.
 2. Remove flux residue by scrubbing, neutralizing with ammonia or a 5 to 10 percent solution of washing soda, followed by a clear water rinse.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
 2. Seal and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

END OF SECTION

SECTION 07720
ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Roof hatches.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's data for each product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other Work.
- C. Product Data: For each product indicated.
- D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.

1.3 QUALITY ASSURANCE

- A. Standards: Comply with the following:
1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions shown on Drawings by taking field measurements; proper fit and attachment of parts is required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Sheet: ASTM A 653 with G90; commercial steel, unless otherwise indicated.
1. Structural Quality: Grade 40, where indicated or as required for strength.
- B. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board of thickness indicated.
- C. Nailers: Provide one of the following:
1. Noncombustible fiber board.
2. Softwood lumber, fire-retardant treated as allowed by local code.
- D. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
1. Provide nonremovable fastener heads.

- E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- F. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coating.
- G. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- H. Elastomeric Sealant: Recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25.
- I. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.2 ROOF HATCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Babcock-Davis Hatchways, Inc.
 - 2. Bilco Company.
 - 3. Milcor, Inc.
 - 4. O'Keeffe's Inc.
 - 5. General:
- B. Hatches: Frame with minimum 9-inch- high, integral-curb, double-wall construction with 1-1/2-inch insulation, formed cants and cap flashing (roofing counterflashing), with welded or sealed mechanical corner joints. Provide double-wall cover (lid) construction with 1- inch- thick insulation core. Provide gasketing and equip with corrosion-resistant or hot-dip galvanized hardware including pintle hinges, hold-open devices, interior padlock hasps, and both interior and exterior latch handles.
 - 1. Fabricate units to withstand 40-lbf/sq. ft. external and 20-lbf/sq. ft. internal loading pressure.
 - 2. Size: As indicated on Drawings.
 - 3. Prime-Painted Finish: Manufacturer's standard primer ready to receive paint finish as specified in Section 09900 – Painting.
- C. Sloping Roofs: Where slope or roof deck exceeds 1/4 inch per foot, fabricate hatch curbs with height tapered to match slope to level tops of units.
- D. Ladder extension (for roof hatches): Bilco Model 1 LadderUP safety post.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction to ensure that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.
- B. Install roof accessory items according to construction details in NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated,

- C. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- D. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form seal.
- E. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.
- F. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.2 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.
- B. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION

SECTION 07900
JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Interior and Exterior sealant joints.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's literature for each joint-sealant product indicated, including installation instructions.
- B. Samples: Submit one sample for each type and color of joint sealant required. Samples shall be installed in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Shop Drawings: Illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades. Drawings shall indicate type of sealant scheduled to be used at each type of joint condition.
- D. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.
- E. Qualification Data: Submit data indicating capabilities and experience for installers. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Field Test Report: Submit copies of logs and test reports showing results of field adhesion testing and stain testing.
- G. Compatibility and Adhesion Test Reports: Submit reports from sealant manufacturer indicating:
1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current product formulations.
- I. Warranties: Submit sample warranty to be signed jointly by applicator and manufacturer.

1.3 QUALITY ASSURANCE

- A. Qualifications: Installer shall be experienced with project similar in material, design, and extent to those indicated for this Project and shall be approved by sealant manufacturer.

- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
1. If sealants from separate manufacturers must be used and could come in contact with each other, provide written certification from every manufacturer involved that the sealants are compatible and will adhere to each other.
- C. Preconstruction Compatibility and Adhesion Testing:
1. Use manufacturers standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - a. Perform tests under environmental conditions replicating those that will exist during installation.
 2. Submit a minimum of 9 pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 4. At locations where materials fail tests, obtain joint sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
- D. Product Testing: Submitted test results shall be from a qualified testing agency based on testing current sealant formulations within a 36-month period.
1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
 3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.
 4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- E. Preconstruction Field-Adhesion Testing: Before installing sealants, perform adhesion field tests for each type of sealant and joint substrate indicated.
1. Locate test joints where indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when test joints will be erected.
 3. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
 4. Test Method: Test joint sealants by hand-pull method described below:
 - a. Install joint sealants in 60-inch- long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
 - b. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
 - c. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - d. For joints with dissimilar substrates, check adhesion to each substrate separately by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.

5. Conduct number of field adhesion tests for each type of sealant and each type of substrate as follows:
 - a. Not less than 10 tests for the first 1,000 feet of installed sealant and 1 test for each additional 1,000 feet of sealant installed, or 1 test per floor per elevation.
 6. Document results of field adhesion tests and record results in field adhesion test log.
 7. Include in log data on pull distance used to test each joint sealant.
 8. Include data on joints where material connected with pull portion of sealant failed to adhere to joint substrate or tore cohesively.
 9. Inspect joints and record data for the following:
 - a. Complete fill.
 - b. No voids.
 - c. Joint dimensions matching those of manufacturer's recommended details.
 10. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 11. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
 12. Repair sealant test areas by removing damaged materials and applying sealant to test area using same procedure used to originally install the sealant.
- F. Stain Testing: Perform Stain testing of masonry and other porous substrates proposed for use in the Work. Obtain actual samples of materials proposed for use and test to determine if permanent discoloration of porous surfaces will occur from direct contact with sealants. Perform stain testing in conformance with ASTM C1248 and as follows:
1. Notify Architect at commencement of stain testing procedure.
 2. Arrange for manufacturer's field technical representative and Architect to be present during examination of test results.
 3. Cut substrate to provide flat surface for application of sealant.
 4. Separate substrate materials by removable shims to create 1/2 x 1/2 x 3 inch joint.
 5. Fill joint with scheduled sealant, tool, and allow to cure for 21 days at room temperature.
 6. After 21 day curing, remove shims, compress joint to 50 percent of original joint width to 1/4 inch, and place in an oven at 158 degrees F. for 14 days.
 7. After 14 days in oven, remove and allow sample to cool to room temperature.
 8. Examine sample to determine presence of discoloration or change in appearance in any way to exposed surfaces.
 9. After visual inspection, cut sample in half to determine presence of discoloration or change in appearance in any way into the sample itself at the adhesive bond line and presence of bleeding into the area around the adhesive bond line.
 10. Document results of stain tests and record results in stain test log.
 11. Do not install sealants that show evidence of staining substrates.
- G. Field Color and Workmanship Samples: Caulk a section of joint as directed, under job conditions, at least 7 days prior to start of work for review by Architect. When approved, sample shall be used as a standard of comparison for remainder of work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

- B. Store and handle materials in compliance with manufacturers written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.5 PROJECT CONDITIONS

- A. Project Requirements: Do not install when weather conditions or substrate conditions are not acceptable to manufacturer.
 - 1. Ambient and substrate temperature conditions shall be within limits as recommended by sealant manufacturer.
 - 2. Joint widths shall be at least the minimum width allowed by sealant manufacturer and as recommended by Structural Engineer.

1.6 WARRANTY

- A. Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 2 years from date of Substantial Completion.
- B. Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period:
 - a. Urethane Sealants: 5 years from date of Substantial Completion.
 - b. Silicone Sealants: 20 years from date of Substantial Completion.
 - c. Others: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide products as manufactured by one of the following:
 - 1. Pecora
 - 2. Tremco Vulkem
 - 3. Dow Corning Corp.
 - 4. Sika Corp.
 - 5. Sonneborn / Degusa

2.2 MATERIALS

- A. General: The selection of proper sealant for a particular joint shall be in accordance with current published recommendations of the manufacturer.
- B. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

2.3 JOINT SEALANTS

- A. Elastomeric Joint Sealants: Comply with ASTM C 920 and other requirements indicated.
1. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.
 2. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food; provide products that comply with 21 CFR 177.2600.
- B. Solvent-Release Joint Sealants:
1. Acrylic-Based Solvent-Release Joint-Sealant: Comply with ASTM C 1311.
 2. Pigmented Narrow Joint Sealant: Provide manufacturer's standard, solvent-release-curing, pigmented, synthetic-rubber sealant complying with AAMA 803.3 and formulated for sealing joints 3/16 inch or smaller in width.
- C. Acoustical Joint Sealants:
1. Acoustical Sealant for Exposed and Concealed Joints: Provide manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:
 - a. 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.
 2. Acoustical Sealant for Concealed Joints: Provide manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.4 ACCESSORIES

- A. Joint Sealant Backing: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
1. Cylindrical Sealant Backings: ASTM C 1330, provide one of the following, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - a. Type O: Open-cell material.
 - b. Type C: Closed-cell material with a surface skin.
 - c. Type B: Bicellular material with a surface skin.
 - 1) Product: Sof Rod by Nomaco.
 2. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
 3. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

- B. 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.
- C. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- D. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
 - 1. Substrates shall be dry and free of contaminants.
 - 2. Report unsatisfactory conditions to Architect in writing.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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 all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - a. Porous joint substrates: Clean surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
 - b. Nonporous joint substrates: Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 - c. Concrete: Remove laitance and form-release agents from concrete.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Standards:
 - 1. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
 - 2. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- E. Install sealants to comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses provided for each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealants from surfaces adjacent to joint.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants by standard hand-pull method.
 - 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.

4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free from voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
5. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
6. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.

- B. Evaluation of Field-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. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- B. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

3.6 PROTECTION

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

3.7 JOINT-SEALANT SCHEDULE

- A. Horizontal traffic:
 1. Type: 2-part or 3-part (self-leveling) urethane, Type M, Grade P, Class 25, Use T.
 2. Conforming to ASTM C920
 3. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
 - a. Pecora NR-200 Urethane Sealant or Dynatred
 - b. Tremco THC-900/901
 - c. Vulkem 245, Sikaflex 2c SL (self-leveling)
- B. Masonry, concrete to concrete, stucco, steel and wood:
 1. Locations: Expansion and Control Joints.
 2. Type: 3-part chemically curing polyurethane sealant, Type M, Grade NS, Class 25, Use NT, M, A, O.
 3. Conforming to ASTM C920

4. Movement: 50 percent in extension and compression, and sustained temperatures of 250 degrees F in service
 5. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
 - a. Tremco Dymeric 240/240FC Sealant
 - b. Pecora Dynatrol II
 - c. Vulkem 922, Sikaflex 2c NS (non-sag)
 - d. Sonneborn NP-2.
- C. Glass (except exterior, insulating glass or special coated glass), aluminum, and plastics:
1. Type: One-part low modulus moisture cure silicone rubber sealant, Class A, Type S, Grade NS, Class 25, Use NT, M, G, A, and O.
 2. Conforming to ASTM C920.
 3. Movement: 100 percent in extension and 50 percent in compression in service.
 4. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
 - a. Dow Corning 790 Silicone Glazing Sealant
 - b. Pecora 890.
- D. Glass (including insulating glass or special coated glass), aluminum and plastics:
1. Type: One-part medium modulus neutral cure silicone rubber sealant, Type S, Grade NS, Class 25, Use NT, M, G, A, and O.
 2. Conforming to ASTM C 920
 3. Movement of 50 percent in extension and 50 percent in compression in service.
 4. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
 - a. Pecora 895
 - b. Dow Corning 795
 - c. Dow Corning 791
- E. Concrete to concrete, stucco, masonry, aluminum, steel, and wood and Mechanical (ductwork and air conditioning):
1. Locations: Non-expanding Joints.
 2. Type: Type S, Grade NS, Class 25, Use NT, M, A, O.
 3. Conforming to ASTM C920
 4. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
 - a. Sika Sikaflex 1A
 - b. Pecora Dynatrol 1
 - c. Tremco DyMonic FC
 - d. Pecora 345
 - e. Sonneborn NP-1.
- F. Plumbing Fixtures (around toilet, bath, kitchen fixtures, and food service equipment):
1. Type: Silicone rubber sealant with mold inhibitor.
 2. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
 - a. Tremco Proglaze or Tremsil 200
 - b. Dow Corning 999
 - c. Pecora 863 or 898
 - d. Sonneborn Omni-Plus.

G. Acoustical Sealant:

1. Exposed and Concealed Joints:
 - a. Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834
 - b. 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.
 - c. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
 - 1) Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - 2) United States Gypsum Co.; SHEETROCK Acoustical Sealant.
2. Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
 - a. Acceptable Products: Subject to compliance with requirements, provide one of the following products:
 - 1) Pecora Corporation; BA-98.
 - 2) Tremco; Tremco Acoustical Sealant.

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel doors.
 - 2. Steel door frames.
 - 3. Fire rated door and frame assemblies.
- B. Related Sections:
 - 1. Section 08210 – Wood Doors

1.2 SUBMITTALS

- A. Product Data: Submit elevations on each type of door and frame indicated, including door designation, type, level and model, material description, core description, construction details, label compliance, sound and fire-resistance ratings, and finishes.
 - 1. Fire Rated Doors and Frames: Submit installation instructions identifying the hardware products, other materials and work requirements necessary to maintain compliance with UL 10(c) (positive pressure testing as required by IBC Section 714 for fire Tests of Door Assemblies.
- B. Shop Drawings: Submit Drawings showing location and installation requirements for hardware.
- C. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.
- D. Certification: Submit certification that fire rated doors (including frames and hardware as a unit) will comply with UL 10(c) (positive pressure testing) as required by IBC Section 714 for Fire Tests of Door Assemblies.

1.3 QUALITY ASSURANCE

- A. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.
- B. Fire-Rated Door Assemblies: Assemblies shall comply with NFPA 80.
 - 1. Test Pressure: Test at atmospheric pressure.
 - 2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.
- C. Single Source: Provide doors and frames from a single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection as required to prevent damage to finish of factory-finished doors and frames.
- B. Deliver welded frames with spreaders.

- C. Store doors and frames at building site under cover. Place units on minimum 4-inch- high wood blocking. Nonvented plastic or canvas shelters shall not be used for cover. If door packaging becomes wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to avoid metal to metal contact and to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products as manufactured by one of the following:
1. Ceco Door Products; a United Dominion Company.
 2. Curries Company.
 3. Kewanee Corporation (The).
 4. Republic Builders Products.
 5. Steelcraft; a division of Ingersoll-Rand.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 569, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- B. Cold-Rolled Steel Sheets: ASTM A 366, Commercial Steel (CS), or ASTM A 620, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.
- C. Metallic-Coated Steel Sheets: ASTM A 653, Commercial Steel (CS), Type B, with an A40 zinc-iron-alloy (galvannealed) coating; stretcher-leveled standard of flatness.
- D. Doors: Provide doors complying with requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:
1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless), 18 gauge cold-rolled steel.
- E. Frames: Fabricated from 16 gauge steel, conforming to ANSIA250.8/SDI100
- F. Core Construction: One of the following manufacturer's standard core materials that produce a door complying with SDI standards:
1. Interior: Resin-impregnated kraft/paper honeycomb.
 2. Exterior: Polyurethane or Polystyrene.
 3. Fire Rated: Fire Door Cores: Core shall be as allowed by UL 10(c).
- G. Door Silencers: Except on weather-stripped frames, fabricate stops to receive three silencers on strike jambs of single-door frames and two silencers on heads of double-door frames.
- H. Plaster Guards: Provide 0.016-inch- thick, steel sheet plaster guards or mortar boxes to close off interior of openings; place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.
- I. Supports and Anchors: Fabricated from 18 gauge, electrolytic zinc-coated or metallic-coated steel sheet.
- J. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc-coated items are to be built into exterior walls, comply with ASTM A 153, Class C or D as applicable.

- K. Astragals: As required by NFPA 80 to provide fire ratings indicated.
- L. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

2.3 FABRICATION

- A. General: Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.
- B. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.
- C. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- D. Reinforce top and bottom of doors horizontally by 16 gauge steel channels, full width, spot welded to each face at least 3 inches on center. Bevel edge of lock stile.
- E. Accurately mortise doors for locks and hinges. Provide adequate box type reinforcement with steel plates welded to the interior reinforcing channels and drilled and tapped. Provide reinforcement for all other items of hardware.
- F. Exterior Doors and Frames:
 - 1. Fabricate doors, panels, and frames, drip caps and other accessories from metallic-coated steel sheet.
 - 2. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 16 gauge, metallic-coated steel channels with channel webs placed even with top and bottom edges.
 - 3. Secure drip cap to frame of exterior doors.
- G. Clearances:
 - 1. Non-Fire-Rated Doors: Not more than 1/8 inch at jambs and heads, except not more than 1/4 inch between pairs of doors. Not more than 3/4 inch at bottom.
 - 2. Fire-Rated Doors: As required by NFPA 80.
- H. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- I. Frame Construction: Fabricate frames to shape shown.
 - 1. Fabricate frames with mitered or coped and continuously welded corners and seamless face joints.
 - 2. Provide welded frames with temporary spreader bars.
- J. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.
 - 1. For concealed overhead door closers, provide space, cutouts, reinforcement, and provisions for fastening in top rail of doors or head of frames, as applicable.
- K. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

- L. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

2.4 FINISHES

- A. Clean frames by degreasing process and apply thorough coating of primer, covering inside and outside surfaces, to receive paint finish as specified in Section 09900 - Painting.
 - 1. Galvanealed Frames: Coat welds and other disrupted surfaces with zinc-rich paint containing not less than 90 percent zinc dust by weight.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
- B. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 - 1. Place frames before construction of enclosing walls and ceilings.
 - 2. In metal-stud partitions, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Attach wall anchors to studs with screws.
 - 3. Install fire-rated frames according to NFPA 80.
 - 4. For openings 90 inches or more in height, install an additional anchor at hinge and strike jambs.
- C. Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.
 - 1. Fire-Rated Doors: Install within clearances specified in NFPA 80.

3.2 FIELD QUALITY CONTROL

- A. Manufacturer's representative shall inspect fire rated doors (including frames and hardware as a unit) and verify compliance with UL 10C (positive pressure testing) as required by IBC Section 714 for Fire Tests of Door Assemblies. Fire rated doors (including frames and hardware as a unit) which do not comply with UL 10C (positive pressure testing) as required by IBC Section 714 Fire Tests of Door Assemblies shall be removed and replaced at no additional cost to Owner.

3.3 ADJUSTING AND CLEANING

- A. Prime-Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.
- B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION

SECTION 08210

WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Solid-core wood doors.
 2. Factory finishing flush wood doors.
 3. Factory fitting flush wood doors to frames and factory machining for hardware.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's data for each type of door, including details of core and edge construction and trim for openings.
- B. Shop Drawings: Submit drawings showing schedule of doors indicating location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; requirements for veneer matching; and other pertinent data. Note discrepancies between the Drawings and door schedules, and the requirements of regulatory and testing agencies.
- C. Samples:
1. Transparent Finishes:
 - a. Submit 3 samples, 8 inches x 10 inches, for each wood species and transparent finish. Samples shall indicate typical range of color and grain to be expected in the finished work.
 - b. Submit 2 corner sections of doors, approximately 8 inches by 10 inches, with door faces and edgings representing typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Certifications:
1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
- C. Coordination: Contractor shall be responsible for coordinating and obtaining necessary information from Hardware and Metal Frame Manufacturers. Door Manufacturer shall be responsible for coordinating necessary information received by Contractor from Hardware and Metal Frame Manufacturers in order that doors shall be properly prepared to receive hinges and hardware. Contractor shall provide door supplier with approved frame schedule, hardware schedule, and hardware templates. Furnish to door supplier 60 days prior to desired delivery date of doors.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.

- B. Package doors individually in plastic bags or cardboard cartons or as required to protect door edges and faces.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.
- D. Store doors flat and protect from construction activity, dirt, and exposure to sunlight.
- E. Handling:
 - 1. Always handle doors with clean hands or gloves.
 - 2. Do not drag doors across one another.
 - 3. Maintain factory packaging or other means of protection on doors, until date of Substantial Completion.

1.5 PROJECT CONDITIONS

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

1.6 WARRANTY

- A. Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship.
 - 1. Warranty shall also include removal of defective door, hanging, installation or hardware and finishing that may be required due to repair or replacement of defective doors.
 - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
 - a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Algoma Hardwoods Inc.
 - 2. Buell Door Company.
 - 3. Eggers Industries; Architectural Door Division.
 - 4. Lambton Doors.
 - 5. Mohawk Flush Doors, Inc.
 - 6. Marshfield Doors Systems.

2.2 DOOR CONSTRUCTION

- A. Veneers:
 - 1. Transparent Finish: Verify specified finishes match existing prior to commencing work. Notify Architect if specifications conflict with existing conditions.
 - a. Grade: Custom (Grade A faces).
 - b. Species: American Cherry.
 - c. Cut: Plain sliced.
 - d. Match between Veneer Leaves: Book match.
- B. Stiles and Rails:
 - 1. Flush Doors: In accordance with AWI Section 1300.

- C. Cores:
 - 1. Solid Core Doors:
 - a. Particleboard: ANSI A208.1, Grade LD-2, 32 lbs. per cubic foot density or structural composite lumber. Provide doors with structural composite lumber cores at locations where exit devices are indicated.
- D. Toilet Partition Doors:
 - 1. Species: Paint Grade Doors, Paint to match adjacent wall.
 - 2. Louvers: Door manufacturer's standard solid-wood louvers, unless otherwise indicated.
 - 3. Size: As indicated on Drawings.
- E. Adhesives: Do not use adhesives containing urea formaldehyde.

2.3 FABRICATION

- A. Face Veneers, Crossbands and Backers: When wood veneer or medium density overlay faces are specified, doors shall be 5 ply, made up of a face veneer, crossbanding and a core unit, all securely bonded together utilizing type 1 (fully waterproof) adhesive and the hot press assembly technique. All plies must be placed at right angles to adjacent plies. Face veneers shall have a minimum thickness of 1/50 after factory sanding and the individual pieces of veneer forming the face veneer must be spliced or edge glued together
- B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
 - 1. Comply with clearance requirements of referenced quality standard for fitting.
- C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- D. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

2.4 FACTORY FINISHING

- A. General: Factory finishes doors to comply with AWI's "Architectural Woodwork Quality Standards Illustrated" for factory finishing.
- B. Transparent Finish:
 - 1. Grade: Custom.
 - 2. Finish: Manufacturer's standard finish with performance comparable to AWI System TR-4 conversion varnish.
 - 3. Staining: As selected by Architect. Submit samples for selection by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.

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

3.2 INSTALLATION

- A. Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- B. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- C. Doors that are cut or planed for fitting shall be immediately resealed with a transparent wood sealer. Doors shall operate freely without sticking or binding, without hinge-bound conditions and with hardware installed, properly adjusted and functioning.
- D. Site Repair of Factory Finish:
 - 1. Clear and Stain: Minor handling marks or scratches (not through the seal coat) shall be repaired by sanding the damaged area, then topcoating again with polyurethane with a matching gloss.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.

3.4 CLEANING

- A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 08310

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Access doors and frames.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's literature for each type of access door indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Steel Sheet:
1. Hot-Rolled: ASTM A 569, Commercial Steel (CS), Type B; free of scale, pitting, and surface defects; pickled and oiled.
 2. Cold-Rolled: ASTM A 366, Commercial Steel (CS), or ASTM A 620, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.
 - a. Electrolytic zinc-coated steel sheet, complying with ASTM A 591, Class C coating, may be substituted at fabricator's option.
- C. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304; with minimum sheet thickness indicated representing specified thickness according to ASTM A 480.
- D. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum panels indicated.
- E. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide sound foundation for field-applied topcoats despite prolonged exposure.

2.2 ACCESS DOORS AND FRAMES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Bilco Company
 2. J. L. Industries, Inc.
 3. Karp Associates, Inc.
 4. Larsen's Manufacturing Company.
 5. Milcor Limited Partnership.
 6. Nyström Building Products Co.
- B. Flush Access Doors and Frames:
1. Style: As required for wall construction.

2. Material: Prime-painted steel sheet. Provide stainless steel at locations subject to moisture.
3. Door: Minimum 14 gage thick sheet metal, set flush with exposed face flange of frame.
4. Frame: Minimum 16 gage sheet metal.
5. Hinges: Spring-loaded concealed pin type.
6. Lock: Flush screwdriver-operated steel cam.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install access doors flush with adjacent finish surfaces or recessed to receive finish material.
- D. Adjust doors and hardware after installation for proper operation.

END OF SECTION

SECTION 08330
OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Service doors.

1.2 DEFINITIONS

- A. Operation Cycle: One complete cycle of a door begins with the door in the closed position. The door is then moved to the open position and back to the closed position.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
1. Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
- B. Operation-Cycle Requirements: Design overhead coiling door components and operator to operate for not less than 20,000 cycles.

1.4 SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information.
- B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.
- C. Samples: Submit samples for each type of exposed finish required, sizes as indicated below and of same thickness and material indicated for Work.
1. Curtain Slats: 12-inch length.
2. Bottom Bar: 6-inch length.
3. Guides: 6-inch length.
4. Brackets: 6 inches square.
5. Hood: 6 inches square.
- D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the overhead coiling door manufacturer for both installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
1. The Cookson Company.
 2. Cornell Iron Works Inc.
 3. McKeon Rolling Steel Door Company, Inc.
 4. Overhead Door Corporation.

2.2 DOORS

- A. General: Fabricated from Interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of material thickness recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
- B. Service Doors
1. Door Curtain – Non-Insulated:
 - a. Material: Structural-quality, cold-rolled galvanized steel sheets complying with ASTM A 653, with G90 zinc coating.
 - b. Slats: Manufacturer's standard 2-1/4 inch high x 5/8 inch deep, 22 gauge.
 2. Endlocks: Malleable-iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets, or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.
 3. Windlocks: Malleable-iron castings secured to curtain slats with galvanized rivets or high-strength nylon, as required to comply with wind load.
 4. Bottom Bar: Consisting of 2 angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick, either galvanized or stainless-steel or aluminum extrusions to suit type of curtain slats.
 5. Curtain Jamb Guides: Fabricate curtain jamb guides of steel angles, or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Build up units with not less than 3/16-inch- thick, galvanized steel sections complying with ASTM A 36, and ASTM A 123. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain and a continuous bar for holding windlocks.
 6. Weatherseals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to bottom and at top of exterior doors, unless otherwise indicated. At door head, use 1/8-inch- thick, replaceable, continuous sheet secured to inside of curtain coil hood.

2.3 HOODS AND ACCESSORIES

- A. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head and act as weatherseal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.
1. Materials: Steel, 24 gauge minimum, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653.
- B. Push/Pull Handles: For push-up-operated or emergency-operated doors, provide galvanized steel lifting handles on each side of door.
1. Provide pull-down straps or pole hooks for doors more than 84 inches high.

2.4 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of adjustable-tension steel helical torsion spring, mounted around a steel shaft and contained in a spring barrel connected to door curtain with required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.
- D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast-iron or cold-rolled steel plate with bell-mouth guide groove for curtain.

2.5 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel:
 - 1. Thermoset Finish: Apply manufacturer's standard baked finish consisting of primer and thermosetting topcoat according to coating manufacturer's written instructions for cleaning, pretreatment, application, thermosetting, and minimum dry film thickness.
 - 2. Color: As selected by Architect from manufacturer's full range of colors and glosses.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.

3.2 ADJUSTING

- A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

3.3 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 08410

ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior entrance and storefront systems.
- B. Related sections:
 - 1. Section 07900 - Joint Sealants.
 - 2. Section 08710 - Door Hardware
 - 3. Section 08800 - Glazing

1.2 SYSTEM DESCRIPTION

- A. General: Provide aluminum entrance and storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:
 - 1. Air infiltration and water penetration exceeding specified limits.
 - 2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.
- B. Glazing: Physically and thermally isolate glazing from framing members.
- C. Wind Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.
 - 1. Deflection of framing members in a direction normal to wall plane is limited to L/175 of clear span or 3/4 inch, whichever is smaller, unless otherwise indicated.
 - 2. Static-Pressure Test Performance: Provide entrance and storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.
 - a. Test Pressure: 150 percent of inward and outward wind-load design pressures.
 - b. Duration: As required by design wind velocity; fastest 1 mile of wind for relevant exposure category.
- D. Seismic Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 9, "Earthquake Loads," whichever are more stringent.
- E. Dead Loads: Provide entrance- and storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.
 - 1. Provide a minimum 1/8-inch clearance between members and top of glazing or other fixed part immediately below.
 - 2. Provide a minimum 1/16-inch clearance between members and operable windows and doors.

- F. Live Loads: Provide entrance and storefront systems, including anchorage, that accommodate the supporting structures' deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.
- G. Air Infiltration: Provide entrance and storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft.
- H. Water Penetration: Provide entrance and storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 10 lbf/sq. ft. Water leakage is defined as follows:
 - 1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.
- I. Thermal Movements: Provide entrance and storefront systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- J. Structural-Support Movement: Provide entrance and storefront systems that accommodate structural movements including, but not limited to, sway and deflection.
- K. Dimensional Tolerances: Provide entrance and storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.
- L. Performance - Aluminum Doors (Swinging): Resistance to corner racking shall be tested by the Dual Moment Load test as follows:
 - 1. Test section shall consist of standard top door corner assembly. Side rail section shall be 24 inches long and top rail section 12 inches long.
 - 2. Anchor "top rail" positively to test bench so that corner protrudes 3 inches beyond bench edge.
 - 3. Anchor a lever arm positively to side rail at a point 19 inches from inside edge of top rail. Attach weight support pad at a point 19 inches from inner edge of side rail.
 - 4. Test section shall withstand a minimum load of 200 pounds on the lever arm before reaching the point of failure, which shall be considered a rotation on the lever arm in excess of 45 degrees.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for each product specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings:
 - 1. Entrance and storefront systems. Show details of fabrication and installation, including plans, elevations, sections, details of components, provisions for expansion and contraction, attachments to other work and glazing details.
 - 2. Entrance systems: Submit hardware schedule and indicate operating hardware types, quantities, and locations.

- C. Samples:
1. Submit 2 samples of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
 2. Samples will be reviewed by Architect for color and texture only.
 3. Cutaway Sample: Architect reserves the right to require samples of typical fabricated sections, showing joints, exposed fastenings (if any), quality of workmanship, glazing, flashing and drainage, expansion provisions, structural sealant joints, hardware and accessory items, before fabrication of the Work proceeds. Samples shall be made from minimum 6-inch lengths of full-size components.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing entrance and storefront systems similar to those required for this Project and who is acceptable to manufacturer.
1. Engineering Responsibility: Prepare data for entrance and storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Source Limitations: Obtain entrance and storefront systems, including finishes, used for this project through one source from a single manufacturer. Operable windows used in conjunction with these systems shall be manufactured by a company whose products are compatible with the specified entrances and storefront.
- C. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code-Aluminum."
- D. Regulatory Requirements:
1. ANSI A117.1 "Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People."
 2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA)."
 3. ADA Accessibility Guidelines (ADAAG).

1.5 PROJECT CONDITIONS

- A. Field Measurements:
1. Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 2. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 3. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating systems without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions to ensure proper fit.

1.6 WARRANTY

- A. Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of entrance and storefront systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
1. Structural failures including, but not limited to, excessive deflection.
 2. Adhesive or cohesive sealant failures.
 3. Failure of system to meet performance requirements.
 4. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 5. Failure of operating components to function normally.

- B. System Warranty Period: 5 years from date of Substantial Completion.
- C. Finish Warranty: Warrant anodized coating against excessive fading, excessive non- uniformity of color or shade, cracking, peeling, pitting or corroding (all within the limits defined). Warranty shall include replacement at no charge (material and labor) within 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Arcadia
 - 2. EFCO Corporation.
 - 3. Kawneer Company, Inc.
 - 4. U.S. Aluminum.
 - 5. Southwest Aluminum Systems, Inc.
 - 6. Vistawall Architectural Products.

2.2 MATERIALS

- A. Aluminum: Extruded 6063 T5 aluminum alloy (ASTM B221 - Alloy G.S. 10aT5), complying with the requirements of standards indicated below.
 - 1. Sheet and Plate: ASTM B 209.
 - 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.
 - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 - 4. Bars, Rods, and Wire: ASTM B 211.
 - 5. Welding Rods and Bare Electrodes: AWS A5.10.
- B. Steel Reinforcement: Complying with ASTM A 36 for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 for hot-rolled sheet and strip.
- C. Glazing: As specified in Section 08800 – Glazing.
- D. Glazing Gaskets: Elastomeric extrusions as required to provide specified performance. Vinyl (PVC) glazing gaskets are not acceptable.
- E. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements. Wood is not an acceptable material for setting blocks or shims.
- F. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- G. Sealants and joint fillers: As specified in Section 07900 – Joint Sealants.
- H. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil thickness per coat.

2.3 COMPONENTS

- A. Doors: Provide manufacturer's standard 1-3/4-inch- thick glazed doors with minimum 0.125-inch- thick, extruded tubular rail and stile members. Corners shall be mechanically fastened with reinforcing brackets or deep penetration and fillet welded.
 - 1. Glazing Stops and Gaskets: Provide manufacturer's standard snap-on extruded-aluminum glazing stops and preformed gaskets.
 - 2. Medium Stile:
 - a. Vertical Stile: 3-1/2 inches.
 - b. Top Rail: 3-1/2 inches.
 - c. Bottom Rail: 10 inches
- B. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide 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.
 - 1. Reinforce members as required to retain fastener threads.
 - 2. Do not use exposed fasteners, except for hardware application. For hardware application, use countersunk Phillips flat-head machine screws finished to match framing members or hardware being fastened, unless otherwise indicated.
- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing, compatible with adjacent materials and of type recommended by manufacturer.
- F. Weather Stripping: Manufacturer's standard replaceable weather stripping as follows:
 - 1. Compression Weather Stripping: Molded neoprene complying with ASTM D 2000 requirements or molded PVC complying with ASTM D 2287 requirements.
- G. Accessories: Provide end-dams, water deflectors and other accessories as required for proper drainage.
- H. Hardware: Finish Hardware shall be furnished by Section 08710 – Finish Hardware and installed under this Section. No Exceptions.

2.4 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. When shop fabricated, clearly mark components to identify their locations in Project according to Shop Drawings.
 - 1. Reinforce the Work as necessary for performance requirements, and for support to the structure.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
- C. Prepare components to receive concealed fasteners and anchor and connection devices.

- D. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- E. Welding: Weld components to comply with referenced AWS standard. Weld before finishing components to greatest extent possible. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- F. Glazing Channels: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."
- G. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Storefront: Fabricate framing in profiles indicated on Drawings and in accordance with manufacturer's approved details.
 - 1. Reinforce internally with steel channel shapes as indicated, or as necessary to support the required loads. Secure vertical steel at head and sill as necessary for structural performance.
- I. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory assemble door and frame units and factory install hardware to greatest extent possible. Reinforce door and frame units as required for installing hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.
 - 1. Exterior Doors: Provide compression weather stripping at fixed stops. At other locations, provide sliding weather stripping retained in adjustable strip mortised into door edge.
- J. Flashings and Miscellaneous Trim:
 - 1. Provide interior sills, exterior sill (or subsills) with end dams, closures, flashings, trim and other elements in conjunction with or adjacent to storefront system as required for watertightness and aesthetics. If sill frame does not provide means for conducting water out of the aluminum frame systems, then suitable flashings to ensure that water is conducted out of system shall be provided.
 - 2. Fabricate miscellaneous trim from 0.060-inch-thick minimum aluminum (break metal) finished to match other components, except fabricate interior and exterior sills (or subsills) from 0.075-inch-thick minimum extruded aluminum (unless the sill or subsill is supporting the weight of the system and then a 0.125-inch thick minimum extruded aluminum shall be provided).
 - 3. Flashings and sill can, in conjunction with mechanically fastened end dams and/or water diverters shall direct water entering the system to the outside of the building and shall not depend solely upon sealants.

2.5 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

- C. Class II, Clear Anodic Finish: AA-M12C22A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

2.6 STEEL PRIMING

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying primer.
- B. Surface Preparation: Perform manufacturer's standard cleaning operations to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel.
- C. Priming: Apply manufacturer's standard corrosion-resistant primer immediately after surface preparation and pretreatment

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of entrance and storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- D. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise recommended by manufacturer. Comply with requirements of Section 07900 - Joint Sealants.
- E. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.
- F. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.
 - 1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
- G. Glazing: Comply with requirements of Section 08800 - Glazing unless otherwise indicated.

- H. Install perimeter sealant to comply with requirements of Section 07900 - Joint Sealants, unless otherwise indicated.
- I. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances:
 - 1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet; 1/4 inch over total length.
 - 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
 - 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing agency to test the storefront system for water leaks in accordance with AAMA 501.2.94.
- B. Repair or remove and replace Work that does not meet requirements or that is damaged by testing; replace to conform to specified requirements.

3.4 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.
- B. Remove excess sealant and glazing compounds, and dirt from surfaces.

3.5 CLEANING

- A. Clean aluminum surfaces promptly after installation of frames, exercising care to avoid damage of the protective coating.
- B. Remove excess glazing and sealant compounds, dirt, and other substances.

3.6 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 08520
ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Aluminum-framed windows:
 - 1. Outswing casement windows.
 - 2. Fixed windows
 - 3. Sliding Windows.

- B. Related Sections:
 - 1. Section 08800 – Glazing: Glazing requirements for aluminum windows, including those specified to be factory glazed.

1.2 DEFINITIONS

- A. C: Commercial.

- B. Performance grade number, included as part of the AAMA/NWWDA product designation code, is actual design pressure in pounds force per square foot used to determine structural test pressure and water test pressure.

- C. Structural test pressure, for uniform load structural test, is equivalent to 150 percent of design pressure.

- D. Minimum test size is smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified and that are of test size indicated below:
 - 1. Minimum size required by AAMA/NWWDA 101/I.S.2.

- B. AAMA/NWWDA Performance Requirements: Provide aluminum windows of the performance class and grade indicated that comply with AAMA/NWWDA 101/I.S.2.
 - 1. Performance Class: C.
 - 2. Exception to AAMA/NWWDA 101/I.S.2: In addition to requirements for performance class and performance grade, design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on the following:
 - a. Testing performed according to AAMA/NWWDA 101/I.S.2, Uniform Load Deflection Test or structural computations.
 - b. Structural computations.

- C. Thermal Movements: Provide aluminum windows, including anchorage, that accommodate thermal movements of units resulting from the following maximum change (range) in ambient and surface temperatures without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects. Base

engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime-sky heat loss.

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

D. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/NWWDA 101/I.S.2, Air Infiltration Test.

1. Maximum Rate: 0.3 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft..

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, operational clearances, and the following:

1. Joinery details.
2. Expansion provisions.
3. Flashing and drainage details.
4. Glazing details.

C. Samples: Aluminum window components, sizes as follows:

1. Main Framing Member: 12-inch- long, full-size sections of extrusions with factory-applied color finish.
2. Hardware: Full-size units with factory-applied finish.
3. Weather Stripping: 12-inch- long sections.

D. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency, for each type, grade, and size of aluminum window. Test results based on use of down-sized test units will not be accepted.

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

F. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

G. Fenestration Standard: Comply with AAMA/NWWDA 101/I.S.2, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01310 - Project Management and Coordination

1.5 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Failure to meet performance requirements.
2. Structural failures including excessive deflection.
3. Water leakage, air infiltration, or condensation.
4. Faulty operation of movable sash and hardware.

5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
6. Insulting glass failure.

B. Warranty Period: 2 years from date of Substantial Completion.

C. Finish Warranty: Warrant coating against excessive fading, excessive non- uniformity of color or shade, cracking, peeling, pitting or corroding (all within the limits defined). Warranty shall include replacement at no charge (material and labor) within 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products as manufactured by one of the following:
1. International.
 2. Western Insulated
 3. Milgard.
 4. Jeld-Wen.

2.2 MATERIALS, GENERAL

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi ultimate tensile strength, not less than 16,000-psi minimum yield strength, and not less than 0.125-inch thickness at any location for the main frame and sash members.
- B. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components. Cadmium-plated steel fasteners are not permitted.
1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, splined grommet nuts.
 2. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.
- 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; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel anchors, clips, and accessories are not permitted.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, 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; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel reinforcing members are not permitted.
- E. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.3 GLAZING

- A. Glass and Glazing Materials: As specified in Section 08800 - Glazing

2.4 HARDWARE

- A. Projected Hardware:
 - 1. Hinges: Heavy duty 4-bar meeting ANSI/AAMA 904.1 with positive stop and adjustable friction shoe.
 - 2. Locking Hardware: Cam handle, strike and keeper, finish as selected by Architect from manufacturer's standard.
- B. Horizontal Sliding Hardware:
 - 1. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.
 - a. Weather Seals: Provide weather stripping with integral barrier fin or fins of semirigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.
 - 2. Handle: Cam action type to provide positive locking.
 - 3. Rollers: Metallic.

2.5 FABRICATION

- A. General: Fabricate aluminum windows, in sizes indicated, that comply with requirements and that meet or exceed AAMA/NWWDA 101/I.S.2 performance requirements for the indicated window type and performance class. Include a complete system for assembling components and anchoring windows.
- B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.
- C. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- D. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- E. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.125-inch- thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- F. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Section 08800 - Glazing and with AAMA/NWWDA 101/I.S.2. Comply with published recommendations of glass manufacturers and GANA's "Glazing Manual" unless more stringent requirements are indicated.
- G. Glazing Stops: Provide snap-on glazing stops coordinated with Section 08800 - Glazing and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

2.6 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Finish: To match storefront systems as specified in Section 08410.

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; rough opening dimensions; levelness of sill plate; coordination with wall flashings, and other built-in components; operational clearances; and other conditions affecting performance of work.
 - 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.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components; Drawings; and Shop Drawings.
- B. Install windows 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 weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWWDA 101/I.S.2.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
- B. Testing Services: Testing and inspecting of installed window shall be executed in accordance with AAMA 501.2-94
- C. Remove and replace windows where test results indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 PROTECTION AND CLEANING

- A. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

END OF SECTION

SECTION 08620

UNIT SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Factory-assembled unit skylights.
- B. Related Sections:
 - 1. Section 07600 - Sheet Metal Flashing and Trim: Flashing at unit skylights.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's data for unit skylights. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Submit shop drawings showing fabrication and installation system including plans, elevations, sections, details, and attachments to other Work. Show jointing, finishes, hardware, accessories, anchorage methods and thickness of dome material.
- C. Samples: For each type of exposed finish required, in a representative section of each unit in manufacturer's standard size.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.
- B. Storage: Adequately protect against damage while stored at the site.
- C. Handling: Comply with manufacturer's instructions.

1.4 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Uncontrolled water leakage.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 3. Yellowing of acrylic glazing.
- B. Warranty Period: 5 years from Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products as manufactured by one of the following:
 - 1. Bristolite Skylights
 - 2. CPI International
 - 3. Kalwall Corporation
 - 4. Naturalite Skylight Systems

5. O'Keeffe's Inc.
6. Wasco Products, Inc.

2.2 UNIT SKYLIGHTS

- A. General: Factory-assembled units that include glazing, extruded-aluminum glazing retainers, gaskets, and inner frames and that are capable of withstanding design loads indicated.
- B. Site-Built Curb: As specified in Section 06100 - Rough Carpentry.
- C. Unit Shape and Size: As indicated on Drawings.
- D. Acrylic Glazing: ASTM D 4802, thermoformable, monolithic sheet, Category as standard with manufacturer, Type UVA (formulated with UV absorber), Finish 1 (smooth or polished).
 1. Double-Glazing Profile: Dome.
 - a. Outer Glazing Color: White, translucent.
 - b. Inner Glazing Color: White, translucent.
- E. Glazing Gaskets: Manufacturer's standard.
- F. Aluminum Components:
 1. Sheets: ASTM B 209, alloy and temper to suit forming operations and finish requirements but with not less than the strength and durability of alclad alloy 3005-H25.
 2. Extruded Shapes: ASTM B 221, alloy and temper to suit structural and finish requirements but with not less than the strength and durability of alloy 6063-T52.
 3. Class II, Clear Anodic Finish: AA-M12C22A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.
- G. Fasteners: Same metal as metal being fastened, nonmagnetic stainless steel, or other noncorrosive metal as recommended by manufacturer. Finish exposed fasteners to match material being fastened.
 1. Where removal of exterior exposed fasteners might allow access to building, provide nonremovable fastener heads.
- H. Condensation Control: Fabricate unit skylights with integral internal gutters and nonclogging weeps to collect and drain condensation to the exterior.
- I. Thermal Break: Fabricate unit skylights with thermal barrier separating interior metal framing from materials exposed to outside temperature.

2.3 ACCESSORIES

- A. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic, nominally free of sulfur and containing no asbestos fibers, formulated for 15-mil dry film thickness per coating.
- B. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- C. Elastomeric Sealant: ASTM C 920; Type S; Grade NS; Class 25; and Uses NT, G, A, and (as applicable to joint substrates indicated) O; recommended by unit skylight manufacturer and compatible with joint surfaces.
- D. Roofing Cement: ASTM D 4586, asbestos free, designed for trowel application or other adhesive compatible with roofing system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination:
 - 1. Coordinate with other work which affects, connects with, or will be concealed by this Work.
 - 2. Coordinate with installation of roofing and flashing.

3.2 INSTALLATION

- A. Coordinate unit skylight installation with installation of substrates, vapor retarders, roof insulation, roofing, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.
 - 1. Unless otherwise indicated, install unit skylights according to construction details of NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Where metal surfaces of units will contact incompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by unit skylight manufacturer.
- C. Anchor unit skylights securely to supporting substrates.
- D. Set unit skylight flanges in thick bed of roofing cement to form a seal, unless otherwise indicated.
- E. Where cap flashing is indicated, install to produce waterproof overlap with roofing or roof flashing. Seal with thick bead of mastic sealant except where overlap is indicated to be left open for ventilation.

3.3 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION

SECTION 08710
DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Commercial door hardware for the following:
 - a. Swinging doors.
 - b. Sliding doors.
 - c. Folding doors.
 - d. Other doors to the extent indicated.
 2. Cylinders for doors specified in other Sections.
 3. Electrified door hardware.
- B. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
1. Cylinders for locks on aluminum and glass entrance doors.
 2. Final replacement cores and keys to be installed by Owner.

1.2 SUBMITTALS

- A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings:
1. Style and finish.
 2. Locations and mounting heights of each item of hardware. Use established numbering system.
 3. Include a complete listing of equipment and materials including manufacturer, catalog number, finish, diagrams, (including cut-sheets), schematics and all other pertinent data.
- C. Samples: If requested by Architect, submit one sample of each type of exposed door hardware indicated for use..
1. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- D. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 - a. Organize door hardware sets in same order as in the Door Hardware Schedule..
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.

- d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
- E. Keying Schedule: Prepared by supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
- F. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.
 - 1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products comply with requirements.
- H. Maintenance Data: For each type of door hardware to include in maintenance manuals. Provide Manufacturer's parts list and maintenance instructions for each type of hardware supplied and necessary wrenches and tools required for proper maintenance of hardware.
- I. Certification:
 - 1. At the completion of installation, certify that material is properly installed according to Manufacturers printed instructions.
 - 2. Submit certification that hardware for fire rated doors (including doors and frames as a unit) will comply with UL 10C (positive pressure testing) as required by 1997 UBC for Fire Tests of Door Assemblies.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed a minimum of 10 installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Supplier Qualifications: Supplier shall meet the following criteria:
 - 1. Employs an Architectural Hardware Consultant who is member of the DHI.
 - 2. Factory authorized stocking distributor of the approved items.
 - 3. Holder of legally required licenses.
 - 4. Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware 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, and who is acceptable to manufacturer of primary materials.
 - a. Engineering Responsibility: Prepare data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

- C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
 - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.

- D. Regulatory Requirements: Comply with applicable provisions of the following:
 - 1. Accessibility requirements:
 - a. ANSI A117.1 "Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People."
 - b. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA)."
 - c. ADA Accessibility Guidelines (ADAAG).
 - 2. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

- E. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
 - 1. Test Pressure: Test at atmospheric pressure in compliance with UL 10(c) (positive pressure testing). This requirement shall take precedence over other requirements for such hardware.

- F. Keying Conference: Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2. Preliminary key system schematic diagram.
 - 3. Requirements for key control system.
 - 4. Address for delivery of keys.

- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01310 - Project Management and Coordination. Review methods and procedures related to electrified door hardware including, but not limited to, the following:
 - 1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
 - 2. Review sequence of operation for each type of electrified door hardware.
 - 3. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review required testing, inspecting, and certifying procedures.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Package each item of hardware in original and individual containers, complete with all necessary fastenings, keys, instructions, and templates for spotting mortising tools.
 - 1. Mark each container with its item number corresponding to the item number on the finish hardware schedule.
 - 2. Containers holding locks shall show the following corresponding to that shown on the finish hardware schedule:
 - a. Heading number
 - b. Door number
 - c. Hand of door (when required)
 - d. Keying symbol (developed by Owner)
 - 3. A typewritten schedule in DHI format conforming with the approved schedule shall accompany each shipment.

- B. When hardware must be installed at the factory, the hardware supplier shall send all such needed items to the respective supplier for their use in installation. The cost of this shipping requirement shall be borne by the hardware supplier.
- C. Acceptance at Site: Upon delivery of the finish hardware to the job site, check in and sign for all material delivered and thereafter be responsible for same.
- D. Storage and Protection: Provide a secured area with sufficient space and shelving in which to store and inventory all materials under lock and key. Protect hardware from damage at all times.

1.5 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system, access control system.

1.6 WARRANTY

- A. Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of operators and door hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty Period:
 - 1. Typical: 3 years from date of Substantial Completion, unless otherwise indicated.
 - 2. Locks: 7 years from date of Substantial Completion.
 - 3. Manual Closers: 10 years from date of Substantial Completion.
 - 4. Concealed Overhead Closers: 5 years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 HINGES AND PIVOTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hinges:
 - a. Ives (IVE)
 - b. Bommer.
 - 2. Pivots and Pivot Hinges:
 - a. Ives (IVE).

- b. Rixson.
 - 3. Continuous Geared Hinges:
 - a. Pemko (PEM)
 - b. Select.
- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Base Metal: Unless otherwise indicated, provide the following:
 - 1. Exterior Hinges: Stainless steel, with stainless-steel pin.
 - 2. Interior Hinges: Steel, with steel pin.
- D. Hinges for Fire-Rated Assemblies: Steel, with steel pin. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:
 - 1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
 - a. Outswinging exterior doors.
 - b. Outswinging corridor doors with locks.
- E. Corners: Square with five knuckles except at spring hinges.
- F. Doors that are fire rated and doors with closers shall have ball bearing hinges. Hardware sets may indicate that all doors are to have ball bearing hinges.
- G. Electrified Functions for Hinges: Comply with the following:
 - 1. Power Transfer: Concealed EPT-jacketed wires, secured at each leaf and continuous through hinge knuckle.
- H. Continuous-Geared Hinges: Not required for this project.
- I. Fasteners: Comply with the following:
 - 1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
 - 2. Wood Screws: For wood doors and frames.
 - 3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
 - 4. Screws: Phillips flat-head screws; machine screws (drilled and tapped holes) for metal doors wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.2 LOCKS AND LATCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Mechanical Locks and Latches:
 - a. Schlage (SCH) – No Substitution.
- B. Lock Trim: Comply with the following:
 - 1. Lever: Wrought
 - 2. Escutcheon (Rose): Wrought
 - 3. Dummy Trim: Match lever lock trim and escutcheons.
 - 4. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:
 - a. Bored Locks: Provide type as listed in Hardware Sets.

- C. Lock Functions: Function numbers and descriptions indicated in the Door Hardware Schedule comply with the following:
 - 1. Bored Locks: BHMA A156.2.
 - 2. Mortise Locks: BHMA A156.13.
 - 3. Interconnected Locks: BHMA A156.12.
- D. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch (12.7-mm) latchbolt throw.
 - 2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 - 3. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- E. Rabbeted Doors: Provide special rabbeted front and strike on locksets for rabbeted meeting stiles.
- F. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

2.3 ELECTRIFIED LOCKS AND LATCHES - Not required for this project.

2.4 DOOR BOLTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Flush Bolts:
 - a. Ives (IVE)
 - b. Trimco.
 - c. BBW
- B. Bolt Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
 - 1. Mortise Flush Bolts: Minimum 3/4-inch (19-mm) throw.

2.5 EXIT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Von Duprin (VON) – No Substitution.
- B. Certified Products: Provide exit devices listed in BHMA's "Directory of Certified Exit Devices."
- C. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- D. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- E. Outside Trim: See Hardware Sets.
 - 1. Match design for locksets and latchsets, unless otherwise indicated.
- F. Through Bolts: For exit devices and trim on fire-rated wood doors.

2.6 CYLINDERS AND KEYING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cylinders: Same manufacturer as for locks and latches.
 - 2. Cylinders:
 - a. Schlage (SCH) – No Substitution.
 - 3. Key Control Systems – Not required for this project.
- B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: 6 pin removeable core.
 - 2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
 - 3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 4. Bored-Lock Type: Removeable core to suit locks.
- C. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
 - 1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
- D. Construction Keying: Comply with the following:
 - 1. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 5 construction master keys.
 - a. Replace construction cores with permanent cores, as directed by Owner.
 - b. Furnish permanent cores to Owner for installation.
- E. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
 - 1. Master Key System: Cylinders are operated by a change key and a master key.
- F. Keys: Provide nickel-silver keys complying with the following:
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
 - 2. Quantity: In addition to one extra blank key for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.
 - c. Key Control System: - Not required for this project.

2.7 STRIKES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Electric Strikes – Not required for this project.
- B. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.

3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

- C. Dustproof Strikes: BHMA Grade 1.

2.8 OPERATING TRIM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Ives (IVE).
 2. Trimco.
 3. BBW.
- B. Materials: Fabricate from brass, bronze or stainless steel, unless otherwise indicated.

2.9 ACCESSORIES FOR PAIRS OF DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Coordinators:
 - a. Ives (IVE).
 - b. Trimco.
 - c. BBW.

2.10 CLOSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Surface and Concealed Closers:
 - a. LCN – No Substitution.
- B. Certified Products: Provide door closers listed in BHMA's "Directory of Certified Door Closers."
- C. Power-Assist Closers: As specified in Division 8 Section "Power Door Operators" for access doors for the disabled or where listed in the Door Hardware Schedule. Provide electrohydraulic, electromechanical, and pneumatic types as indicated.
- D. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.11 PROTECTIVE TRIM UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Metal Protective Trim Units:
 - a. Ives (IVE).
 - b. Trimco.
 - c. BBW.
- B. Materials: Fabricate protection plates from the following:
 1. Stainless Steel: 0.050 inch (1.3 mm) thick; beveled top, bottom and 2 sides.

- C. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.
- D. Furnish protection plates as specified in Door Hardware Schedule.

2.12 STOPS AND HOLDERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ives (IVE).
 - 2. Trimco.
 - 3. BBW.
- B. Floor Stops: For doors, unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic.
 - 1. Where floor or wall stops are not appropriate, provide overhead stops.
- C. Silencers for Wood Door Frames: BHMA Grade 1; neoprene or rubber, minimum 5/8 by 3/4 inch (16 by 19 mm); fabricated for drilled-in application to frame.
- D. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

2.13 DOOR GASKETING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Door Gasketing:
 - a. Pemko (PEM).
 - b. National Guard.
 - 2. Door Bottoms:
 - a. Pemko (PEM).
 - b. National Guard.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- C. Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.
- D. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.
- E. Fire-Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL 10B or NFPA 252.
- F. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

- G. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- H. Gasketing Materials: Comply with ASTM D 2000 and AAMA 701/702.

2.14 THRESHOLDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pemko (PEM).
 - b. National Guard.

2.15 SLIDING DOOR HARDWARE – Not required for this project.

2.16 MISCELLANEOUS DOOR HARDWARE

- A. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems.

2.17 FABRICATION

- A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- B. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Steel Machine or Wood Screws: For the following fire-rated applications:
 - a. Mortise hinges to doors.
 - b. Strike plates to frames.
 - c. Closers to doors and frames.
 - 3. Steel Through Bolts: For the following fire-rated applications, unless door blocking is provided:
 - a. Surface hinges to doors.
 - b. Closers to doors and frames.
 - c. Surface-mounted exit devices.
 - 4. Spacers or Sex Bolts: For through bolting of hollow metal doors.
 - 5. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.18 FINISHES

- A. Standard: Comply with BHMA A156.18.

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. BHMA Designations: Comply with base material and finish requirements indicated by the following:
 - 1. BHMA 600: Primed for painting, over steel base metal.
 - 2. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
 - 3. BHMA 628: Satin aluminum, clear anodized, over aluminum base metal.
 - 4. BHMA 630: Satin stainless steel, over stainless-steel base metal.
 - 5. BHMA 652: Satin chromium plated over nickel, over steel base metal.
 - 6. BHMA 689: Aluminum painted, over any base metal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
 - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.
- B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

- 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above Verify location with Architect.
 - 1. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Section 07900 - Joint Sealants.

3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:
 - 1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
 - 2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
 - 3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DOOR HARDWARE SCHEDULE

HW SET: 01

DOOR NUMBER:
100 111

EACH TO HAVE:

2	EA	PIVOT SET	7226	626	IVE
2	EA	PIVOT SET	7226 INT	626	IVE
2	EA	POWER TRANSFER	EPT-2	689	VON
1	EA	PANIC DEVICE	EL3547EO	626	VON
1	EA	PANIC DEVICE	EL3547TL	626	VON

CCBG 0428

Spectra 103.05.03

1	EA	CYLINDER	26-091	626	SCH
2	EA	OFFSET DOOR PULL	8190 - 18 - O	630	IVE
2	EA	CONCEALED CLOSER	2034 H	689	LCN
2	EA	OVERHEAD STOP	900S	630	GLY
2	EA	DOOR SWEEP	90100CNB	AL	PEM
1	EA	THRESHOLD	170A MS & ES	AL	PEM
1	EA	POWER SUPPLY	PS873-2B	600	VON
1	EA	WIRING DIAGRAM	POINT TO POINT SYSTEM		VON
1	SET	WEATHERSTRIP	WITH FRAME AND DOORS		

ACCESS CONTROL BY OTHERS

OPERATION DESCRIPTION: ENTRY BY ACCESS CONTROL READER AFTER HOURS. DOORS CAN BE UNLOCKED DURING THE DAY BUT, WILL AUTOMATICALLY LOCK DOWN BY ACCESS CONTROL SYSTEM WHEN PROGRAMMED TO DO SO. FREE EGRESS AT ALL TIMES.

HW SET: 02

DOOR NUMBER:

106B 109B 109D 112C 112D 112E
115B

EACH TO HAVE:

1	EA	PIVOT SET	7226	626	IVE
1	EA	PIVOT SET	7226 INT	626	IVE
1	EA	POWER TRANSFER	EPT	689	VON
1	EA	PANIC DEVICE	EL33NL-OP	626	VON
1	EA	CYLINDER	20-057	626	SCH
1	EA	OFFSET DOOR PULL	8190 - 18 - O	630	IVE
1	EA	CLOSER/STOP/HOLD	4031 H CUSH	689	LCN
1	EA	DOOR SWEEP	90100CNB	AL	PEM
1	EA	THRESHOLD	170A MS & ES	AL	PEM
1	EA	WIRING DIAGRAM	POINT TO POINT SYSTEM		VON
1	SET	WEATHERSTRIP	WITH FRAME AND DOORS		

ACCESS CONTROL BY OTHERS

OPERATION DESCRIPTION: ENTRY WHEN UNLOCKED BY REMOTE ACCESS CONTROL SYSTEM. FREE EGRESS AT ALL TIMES.

HW SET: 03

DOOR NUMBER:

106D SO101C

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	STOREROOM LOCK	ND80RD SPA	626	SCH
1	EA	LOCK GUARD	LG-1	630	IVE
1	EA	CLOSER/STOP	4031 CUSH	689	LCN
1	SET	SEALS	S88D	DKB	PEM
1	EA	DOOR SWEEP	315CN	AL	PEM

1 EA THRESHOLD 171A MS & ES AL PEM

HW SET: 04

DOOR NUMBER:
S0100

EACH TO HAVE:

2	EA	PIVOT SET	7226	626	IVE
2	EA	PIVOT SET	7226 INT	626	IVE
1	EA	3PT DEADLOCK	MS1852S X 4015 X 4085	628	ADA
2	EA	CYLINDER	26-098	626	SCH
2	EA	PUSHBAR	9190 - 18 - N	630	IVE
2	EA	CONCEALED CLOSER	2034 H	689	LCN
2	EA	OVERHEAD STOP	900S	630	GLY
2	EA	DOOR SWEEP	90100CNB	AL	PEM
1	EA	THRESHOLD	170A MS & ES	AL	PEM
1	EA	SIGN	20-0256 "THIS DOOR TO REMAIN"		ADA
1	SET	WEATHERSTRIP	WITH FRAME AND DOORS		

HW SET: 05

DOOR NUMBER:
SO101A

EACH TO HAVE:

2	EA	PIVOT SET	7226	626	IVE
2	EA	PIVOT SET	7226 INT	626	IVE
2	EA	PANIC DEVICE	3547L 17	626	VON
2	EA	CYLINDER	26-091	626	SCH
2	EA	CONCEALED CLOSER	2034 H	689	LCN
2	EA	OVERHEAD STOP	900S	630	GLY
2	EA	DOOR SWEEP	90100CNB	AL	PEM
1	EA	THRESHOLD	170A MS & ES	AL	PEM
1	SET	WEATHERSTRIP	WITH FRAME AND DOORS		

HW SET: 06

DOOR NUMBER:
SO101B

EACH TO HAVE:

1	EA	PIVOT SET	7226	626	IVE
1	EA	PIVOT SET	7226 INT	626	IVE
1	EA	PANIC DEVICE	35NL-OP	626	VON
1	EA	CYLINDER	20-057	626	SCH
1	EA	CONCEALED CLOSER	2034 H	689	LCN
1	EA	OVERHEAD STOP	900S	630	GLY
1	EA	DOOR SWEEP	90100CNB	AL	PEM
1	EA	THRESHOLD	170A MS & ES	AL	PEM
	SET	WEATHERSTRIP	WITH FRAME AND DOORS		

CCBG 0428
Spectra 103.05.03

HW SET: 07

DOOR NUMBER:
SO105A

EACH TO HAVE:

1	EA	PIVOT SET	7226	626	IVE
1	EA	PIVOT SET	7226 INT	626	IVE
1	EA	PANIC DEVICE	35NL-OP	626	VON
1	EA	CYLINDER	20-057	626	SCH
1	EA	CLOSER/STOP	4031 CUSH	689	LCN
1	EA	DOOR SWEEP	90100CNB	AL	PEM
1	EA	THRESHOLD	170A MS & ES	AL	PEM
1	SET	WEATHERSTRIP	WITH FRAME AND DOORS		

HW SET: 08

DOOR NUMBER:
108B

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	CLASSROOM LOCK	ND70RD SPA	626	SCH
1	EA	CLOSER/STOP/HOLD	4031 H CUSH	689	LCN
1	SET	SEALS	S88D	DKB	PEM
1	EA	DOOR SWEEP	315CN	AL	PEM
1	EA	THRESHOLD	171A MS & ES	AL	PEM

HW SET: 09

DOOR NUMBER:
116C

EACH TO HAVE:

2	EA	PIVOT SET	7226 INT	626	IVE
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	PR	AUTO FLUSH BOLT	FB41P	630	IVE
1	EA	CLASSROOM LOCK	ND70RD SPA	626	SCH
1	EA	COORDINATOR	COR X FL X 2 EA. MB	628	IVE
2	EA	SURFACE CLOSER	P4031 H	689	LCN
2	EA	WALL STOP	WS401CVX	626	IVE
2	EA	SILENCER	SR64	GRY	IVE

NOTE: DOORS TO SWING 180 DEGREES OPEN TO WALL BOTH SIDES.

HW SET: 10

DOOR NUMBER:
109A

EACH TO HAVE:

6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
---	----	-------	--------------------	-----	-----

CCBG 0428
Spectra 103.05.03

1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	PR	AUTO FLUSH BOLT	FB41P	630	IVE
1	EA	CLASSROOM LOCK	ND70RD SPA	626	SCH
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	CONCEALED CLOSER	2034 H	689	LCN
2	EA	OVERHEAD STOP	450S	630	GLY
2	EA	SILENCER	SR64	GRY	IVE

HW SET: 11

DOOR NUMBER:

NOT USED.

HW SET: 12

DOOR NUMBER:

NOT USED:

HW SET: 13

DOOR NUMBER:

SO112A SO112B

EACH TO HAVE:

4	EA	SPRING HINGE	3SP1 4.5 X 4.5	652	IVE
2	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
2	EA	DOOR PULLS	8103EZ TYPE F MTG.	626	IVE
2	EA	PUSH PLATE	8200 4" X 16"	630	IVE
2	EA	OVERHEAD HOLDER	410H	630	GLY
2	EA	SILENCER	SR64	GRY	IVE

HW SET: 14

DOOR NUMBER:

110B

EACH TO HAVE:

ALL HDWE. BY DR. MFG.

HW SET: 15

DOOR NUMBER:

110A

EACH TO HAVE:

1	EA	PIVOT SET	7255	626	IVE
---	----	-----------	------	-----	-----

CCBG 0428
Spectra 103.05.03

2	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	CONCEALED CLOSER	6033 H W/BUMPER	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW .050 B4E	630	IVE
1	EA	FLOOR STOP	F436 (INSIDE KITCHEN ONLY)	626	IVE

HW SET: 16

DOOR NUMBER:
107A 116D

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	ND70RD SPA	626	SCH
1	EA	CLOSER/STOP/HOLD	4031 H CUSH	689	LCN
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 17

DOOR NUMBER:
116A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	DBL KEY LOCK	ND66RD SPA	626	SCH
1	EA	SURFACE CLOSER	4031 H	689	LCN
1	EA	WALL STOP	WS401CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 18

DOOR NUMBER:
106A 106E 112A 112B 115A 115C

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	ND70RD SPA	626	SCH
1	EA	SURFACE CLOSER	4031 H	689	LCN
1	EA	WALL STOP	WS401CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

NOTE: PROVIDE FLOOR STOP FS436 AT DOOR 112A.

HW SET: 19

DOOR NUMBER:
101A 102 108A S105B SO103 SO104
SO105C SO111A SO111B

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	ND70RD SPA	626	SCH
1	EA	WALL STOP	WS401CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

NOTE: PROVIDE FLOOR STOP-FS436 AT DOORS 102 AND S0111B.

HW SET: 20

DOOR NUMBER:

105 106C SO107 SO115

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	ND80RD SPA	626	SCH
1	EA	OVERHEAD STOP	450S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 21

DOOR NUMBER:

103A 104A 113A 114A SO108A SO109A

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8305-0 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4031	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW .050 B4E	630	IVE
1	EA	WALL STOP	WS401CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

NOTE: PROVIDE FLOOR STOP FS436 AT DOORS 103A AND 104A.

HW SET: 22

DOOR NUMBER:

103B 103C 104B 113C 114C 114D
SO108C SO109B

EACH TO HAVE:

1	EA	SPRING HINGE	3SP1 4.5 X 4.5	652	IVE
1	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	PRIVACY SET	ND40S SPA	626	SCH
1	EA	WALL STOP	WS401CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

NOTE: PROVIDE HINGE PIN STOP 69F14 AT DOORS 113C AND 114C.

CCBG 0428
Spectra 103.05.03

HW SET: 23

DOOR NUMBER:
SO106

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	ND70RD SPA	626	SCH
1	EA	CONCEALED CLOSER	2033 H W/BUMPER	689	LCN
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 24

DOOR NUMBER:
EXT GATE

EACH TO HAVE:

1	EA	PADLOCK 3/8"X2"	PL4002	606	SCH
---	----	-----------------	--------	-----	-----

BALANCE OF HDWE. BY GATE MFG.

END OF SECTION

SECTION 08800

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Glazing for the following products and applications:
1. Windows.
 2. Doors.
 3. Glazed entrances.
 4. Storefront framing.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind loads without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Thermal Movements: Provide glazing that allows for thermal movements resulting from a maximum change (range) of 120 deg F for ambient surfaces and 180 deg F in surface temperatures, respectively, acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's literature for each glass product and glazing material indicated, including structural, physical and environmental characteristics, size limitations, special handling or installation requirements for glass and plastic materials.
- B. Samples:
1. Glazing: Submit 1 sample, 12 inches x 12 inches for each type of glass product indicated, other than monolithic clear float glass.
 2. Sealant: 4 inch long bead of glazing sealant, color as selected
- C. Glazing Schedule: Use same designations indicated on Drawings.
- D. Reports: Submit sealant compatibility and adhesion test reports.
- E. Manufacturer's Certificate: Submit Manufacturer's certification that sealed insulated glass meets or exceeds specified requirements.

1.4 QUALITY ASSURANCE

- A. Standards:
1. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 2. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
- B. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, and Laminators Safety Glass Association - Standards Manual for Glazing Installation Methods.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.
- 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 is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- C. Storage: Adequately protect against damage while stored at the site.
- D. Handling: Comply with Manufacturer's instructions.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form, made out to Owner and signed by manufacturer, in which manufacturer agrees to furnish replacements for units that deteriorate from normal use by developing defects attributable to the manufacturing process, within warranty period.
 - 1. Insulating Glass:
 - a. Deterioration: Failure of hermetic seal resulting in obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - b. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following manufacturers:
 - 1. Guardian Industries
 - 2. Oldcastle
 - 3. Pilkington
 - 4. PPG Industries
 - 5. Viracon
 - 6. Visteon

2.2 GLASS MATERIALS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); class 1 clear. Provide thicknesses as indicated on Drawings, 1/4 inch minimum.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent glass, flat); Quality q3 (glazing select); class 1, Kind HS (heat strengthened), Condition A (uncoated surfaces)
- C. Safety Glass: Category II materials complying with testing requirements in 16 CFR.1201 and ANSI Z97.1., Kind FT (fully tempered).
- D. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, complying with ASTM E 774 for Class CBA units. Glass shall match existing glazing exactly, no substitutions will be accepted.
 - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites. Provide Kind FT (fully tempered) where safety glass is indicated.

2. Sealing System: Dual seal with manufacturer's standard primary and secondary sealants.
3. Spacer: Manufacturer's standard.
4. Outer Lite: Float glass, Class 1 (clear).
 - a. Thickness: 1/4 inch.
5. Inner Lite: Float glass, Class 1 (clear).
 - a. Thickness: 1/4 inch.
6. Overall Unit Thickness: 1 inch.
7. Interspace Content: Air.

2.3 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated and complying with ASTM C 1281 and AAMA 800. If exposed, tape shall be paintable, or colored to match frame.
- B. Expanded Cellular Glazing Tape: Closed-cell, PVC foam tape; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
 1. Type 1, for glazing applications in which tape acts as the primary sealant.
 2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.4 GLAZING GASKETS

- A. Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal:

2.5 ACCESSORIES

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. 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.
- G. Sealants: As specified in Section 07900 – Joint Sealants.

2.6 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

2.7 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Examine framing or glazing channel surfaces, backing, removable stop design, and conditions under which glazing is to be performed.
- C. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

- A. General:
 - 1. Comply with written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
 - 2. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
 - 3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
 - 4. 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.
 - 5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
 - 6. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:
 - a. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - b. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
 - 7. 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.

8. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
9. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
10. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

B. Tape Glazing:

1. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with, or protrude a maximum of 1/16 inch, above sightline of stops.
2. Install tapes continuously in greatest lengths practical. Do not stretch tapes to make them fit opening.
3. Where framing joints are vertical, apply tapes to heads and sills first and then to jambs. Where framing joints are horizontal, apply tapes to jambs and then to heads and sills.
4. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
5. Do not remove release paper from tape until just before each glazing unit is installed.
6. Apply bed of sealant along exterior void ensuring full contact with glass.
7. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
8. Apply cap bead of sealant along exterior void, to uniform and level line, flush with sightline. Tool or wipe cap bead surface with solvent for smooth appearance.

C. Gasket Glazing (Dry):

1. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
2. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
3. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
4. Install gaskets so they protrude past face of glazing stops.

3.3 ADJUSTING

- A. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in any other way during the construction period, including natural causes, accidents and vandalism.

3.4 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.
- B. Remove labels after Work is completed.

3.5 PROTECTION

- A. Protect glass from breakage immediately upon installation, by attachment of crossed streamers to framing held away from glass.

B. Do not apply markers of any type to surfaces of glass.

END OF SECTION

SECTION 09220

PORTLAND CEMENT PLASTER (STUCCO)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Metal lath and accessories.
 - 2. Portland cement plaster.
 - 3. Stucco finishes.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for each product specified, including application instructions.
- B. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work
- C. Samples: Submit 2 samples, minimum 12 inches x 12 inches, for each type of finish indicated for Architect's approval. Resubmit samples with modified finishes as requested by Architect.
- D. Material Certificates: Submit certificate signed by manufacturer for each kind of plaster aggregate certifying that materials comply with requirements.

1.3 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. Comply with applicable requirements of the Western Lath/Plaster, Drywall Industries Association, Inc, "Reference Specifications and Data Guide", except where more stringent requirements are specified or required by local building codes.
 - 2. Comply with local building codes.
- B. Mockups: Prior to commencing plaster work, construct sample panels for each type of finish and application required
 - 1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Erect mockups, 36 by 36 inches, by full thickness using materials, including lath, support system, and control joints, indicated for final Work.
 - 3. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Obtain Architect's approval of mockups before start of plaster Work.
 - 6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed portland cement plaster Work.
 - a. When directed, remove mockups from Project site and dispose of in a legal manner.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles, with labels intact indicating manufacturer's name, product brand name, and lot number.

- B. Store materials indoors and under cover. Keep stored materials dry and protected from damage.

1.5 PROJECT CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Cold-Weather Requirements: Provide heat and protection, as required to protect each coat of plaster from freezing for a minimum of 24 hours after application. Distribute heat uniformly to prevent concentration of heat on plaster near heat sources; provide deflection or protective screens.
- C. Warm-Weather Requirements: Protect plaster against uneven and excessive evaporation and from strong flows of dry air, both natural and artificial. Apply and cure plaster as required by climatic and job conditions to prevent dry out during cure period. Provide suitable coverings, moist curing, barriers to deflect sunlight and wind, or combinations of these, as required.
- D. Do not apply plaster when ambient temperature is below 40 deg F. or above 80 degrees without prior written approval from the manufacturer.
- E. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 LATH

- A. Lath: Minimum 17 gauge, 1-1/2 inch galvanized steel wire fabric. Lath shall be self furred. Self furring lath must have sufficient clearance between the wire and substrate to allow embedment into the base. All lath and lath attachments shall be of corrosion resistant materials.

2.2 PLASTER MATERIALS

- A. Portland cement, ASTM C 150, Type II.
- B. Lime: Special hydrated lime for finishing purposes, ASTM C 206, Type S; or special hydrated lime for masonry purposes, ASTM C 207, Type S.
- C. Sand Aggregate for Base Coats: ASTM C 897.
- D. Aggregate for Finish Coats: ASTM C 897 system and as indicated below:
 - 1. Manufactured or natural sand, white.

2.3 ACCESSORIES

- A. General: Comply with material provisions of ASTM C 1063 and the requirements indicated below; coordinate depth of accessories with thicknesses and number of plaster coats required.
 - 1. Galvanized Steel Components: Fabricated from zinc-coated (galvanized) steel sheet complying with ASTM A 653, G40 minimum coating designation.
- B. Metal Corner Reinforcement: Formed to reinforce external corners of portland cement plaster on exterior exposures while allowing full plaster encasement. Provide one of the following:
 - 1. Expanded, large-mesh, diamond-metal lath fabricated from zinc-alloy
 - 2. Welded-wire mesh fabricated from 0.0475-inch- diameter, zinc-coated (galvanized) wire.

- C. Casing Beads: Square-edged style, galvanized steel, minimum 0.0172 inches thick (26 gage), maximum possible lengths.
- D. Control Joints: Folded pair of nonperforated screeds in M-shaped configuration, with expanded or perforated flanges, galvanized steel, minimum 0.0172 inches thick (26 gage),
 - 1. Provide removable protective tape on plaster face of control joints.
- E. Foundation Sill (Weep) Screed: Manufacturer's standard profile designed for use at sill plate line to form plaster stop and prevent plaster from contacting damp earth, fabricated from zinc-coated (galvanized) steel sheet.
- F. Lath Attachment: Fastener type required by ASTM C 1063 for installations indicated.
- G. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- H. Bonding Agent: ASTM C 932.
- I. Weather Resistive Barrier: FS UU-B-790a, Type 1, Grade D, Style 2 vapor permeable asphalt-saturated Kraft waterproof building paper.
- J. Steel drill screws: Complying with ASTM C 1002 for fastening metal lath to wood or steel members less than 0.033 inch thick or ASTM C 954 for fastening metal lath to steel members 0.033 to 0.112 inch thick.

2.4 PLASTER MIXES AND COMPOSITIONS

- A. General: Comply with ASTM C 926 for base- and finish-coat mixes as applicable to plaster bases, materials, and other requirements indicated.
- B. Base-Coat Mixes and Compositions: Proportion materials for respective base coats in parts by volume per sum of cementitious materials for aggregates to comply with the following requirements for each method of application and plaster base indicated. Adjust mix proportions below within limits specified to attain workability.
- C. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
 - b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
- D. Factory-Prepared Finish Coats: Add water only; comply with finish coat manufacturer's written instructions.
 - 1. Finish coat shall have integral texture to receive paint finish as specified in Section 09900 - Painting.

2.5 MIXING

- A. Mechanically mix cementitious and aggregate materials for plasters to comply with applicable referenced application standard and with recommendations of plaster manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces and supports to receive Work and report detrimental conditions in writing, with a copy to Architect. Commencement of Work will be construed as acceptance of subsurfaces. Verify, before proceeding with this Work that required inspections of existing conditions have been completed.
- B. Coordination with other Work: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 LATHING

- A. Weather-Resistive Barrier (over stud and sheathing framing):
 - 1. Vertical Surfaces:
 - a. Starting at bottom of wall or lowest level, apply weather barrier horizontally in shingle fashion with the upper layer lapped over the lower layer not less than 2 inches. Lap vertical end laps 6 inches minimum
 - b. Fasten at 12 to 18 inches on center spacing at each vertical stud using steel drill screws with washers.
 - c. Wrap weather-resistive barrier a minimum of 16 inches around all inside and outside corners.
 - d. Install second layer of weather barrier in a similar manner, staggering joints a minimum of 6 inches.
 - e. Lap upstanding flashing with 4 inch minimum overlap.
 - f. Completed installation shall be free of holes or breaks.
- B. Install metal lath over weather resistive barrier where plaster base coats are required. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with referenced ML/SFA specifications and ASTM lathing installation standards.
- C. Standards: Comply with ML/SFA 920, "Guide Specifications for Metal Lathing and Furring," and with requirements of ASTM C 1063.

3.3 PREPARATIONS FOR PLASTERING

- A. Protect contiguous work from soiling and moisture deterioration caused by plastering. Provide temporary covering and other provisions necessary to minimize harmful spattering of plaster on other work.
- B. Clean plaster bases and substrates for direct application of plaster, removing loose material and substances that may impair the Work.
- C. Apply bonding agent on concrete unit masonry surfaces indicated for direct plaster application; comply with manufacturer's written instructions for application.
- D. Install temporary grounds and screeds to ensure accurate rodding of plaster to true surfaces; coordinate with scratch-coat work.
- E. Flashing: As specified in Section 07600 – Sheet Metal Flashing and Trim.

3.4 INSTALLATION OF PLASTERING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.

- B. Reinforcement for External Corners:
 - 1. Install lath-type external-corner reinforcement at exterior locations.
 - 2. Control Joints: Install control joints at locations indicated on Drawings.

3.5 PLASTER APPLICATION

- A. General:
 - 1. Comply with ASTM C 926.
 - 2. Do not deviate more than plus or minus 1/8 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed at any location on surface.
 - 3. Coordinate plaster application with installation and protection of other work so that neither will be damaged by installation of other.
 - 4. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where casing bead does not terminate plaster at metal frame cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 - 5. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Number of Coats: Apply plaster in number of coats as follows:
 - 1. Three Coats: Install scratch coat, brown coat and finish coat.
- C. Scratch Coat: Apply scratch coat with sufficient pressure so that it is forced through the metal reinforcement and against the backing to form full keys and to embed reinforcement completely. Apply to an approximate thickness of 3/8 inch from the face of the backing. Scratch to provide bond for succeeding coat.
- D. Brown Coat: Apply brown coat a minimum of 48 hours after the application of the scratch coat. Dampen scratch coat evenly to obtain uniform suction. Apply to an approximate thickness of 3/8 inch. Bring surface to a true, even surface by floating or rodding and leave rough, ready to receive finish coat.
- E. Finish Coat: Apply finish coat not sooner than seven days after the application of the preceding coat. Before applying, dampen the surface of the preceding coat evenly to obtain uniform suction. Thickness of the finish coat shall be sufficient to secure the texture specified but in no case less than 1/8 inch and the total thickness of the stucco shall be at least 7/8 inch from the face of the backing. Avoid excessive troweling.
 - 1. Schedule Work so entire wall can be completed at one time to eliminate joining marks. If not practical, use a corner, door or window as a breaking point.
 - 2. Finish texture: Light Sand Finish.
- F. Moist-cure plaster base and finish coats to comply with ASTM C 926.

3.6 CUTTING AND PATCHING

- A. Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed. Repair or replace work as necessary to comply with required visual effects.

3.7 CLEANING AND PROTECTING

- A. Remove temporary covering and other provisions made to minimize spattering of plaster on other work. Promptly remove plaster from door frames, windows, and other surfaces not to be plastered. Repair surfaces stained, marred or otherwise damaged during plastering work. When plastering work is completed, remove unused materials, containers, equipment, and plaster debris.

- B. Remove temporary protection and enclosure of other work. Promptly remove plaster from doorframes, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 09250

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum wallboard.
 - 2. Tile backer boards.

1.2 SUBMITTALS

- A. Product Data: For each type of gypsum product, joint, finish and accessories indicated.
- B. Samples:
 - 1. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.
- C. Reports: Submit fire test report for fire rated assemblies.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Comply with applicable specification recommendations of GA-216 and GA-600 as published by the Gypsum Association.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.
- C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or damage metal corner beads and trim.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Gypsum Board and Related Products:
 - a. American Gypsum Co.
 - b. G-P Gypsum Corp.
 - c. National Gypsum Company.
 - d. United States Gypsum Co.
 - e. James Hardie Gypsum
 - f. Pabco Gypsum

2.2 GYPSUM WALLBOARD

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Gypsum Wallboard: ASTM C 36, Type X.
1. Thickness: 5/8 inch.
 2. Long Edges: Tapered.
- C. Tile Backer Board:
1. Wet areas: ASTM C 1178
 - a. Thickness: 5/8 inch.
 - b. Product: Subject to compliance with requirements, provide "Dens-Shield Tile Backer" manufactured by G-P Gypsum Corp.
 2. Dry Areas: Cementitious Backer Units, ANSI A118.9.
 - a. Thickness: 5/8 inch as indicated on Drawings.
 - b. Acceptable Products: Subject to compliance with requirements, provide one of the following:
 - 1) Custom Building Products; Wonderboard.
 - 2) FinPan, Inc.; Util-A-Crete Concrete Backer Board.
 - 3) United States Gypsum Co.; DUROCK Cement Board.

2.3 TRIM ACCESSORIES

- A. Trim: ASTM C 1047.
1. Material: Galvanized steel sheet
 2. Shapes:
 - a. Cornerbead: Bullnose shape, use at outside corners, unless otherwise indicated.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges unless otherwise indicated.
 - c. L-Bead: L-shaped; exposed long leg receives joint compound; use where indicated.
 - d. U-Bead: J-shaped; exposed short flange does not receive joint compound; use where indicated.
 - e. Expansion (Control) Joint: One piece formed with V shaped slot, with removable strip covering slot opening, use where indicated.

2.4 JOINT TREATMENT MATERIALS

- A. Joint Materials: Comply with ASTM C 475
 - 1. Joint Tape:
 - a. Gypsum Wallboard: Paper.
 - b. Glass Mat Board: Glass fiber mesh tape, 2 inches wide.
 - 2. Joint Compound for Interior Gypsum Wallboard and Glass Mat Board: Use material recommended by Board Manufacturer and compatible with other joint compounds applied over it.

2.5 TEXTURE FINISHES

- A. Texture Finish: Manufacturer's standard for walls and ceilings, multi-purpose, pre-packaged, non-asbestos type.
- B. Drywall Primer: White latex drywall primer formulated with high binder solids, applied undiluted, applied to gypsum board surfaces prior to the application of texture materials.
 - 1. Acceptable Product: Sheetrock Brand First Coat as manufactured by USG, or approved equal.
 - 2. Drywall primer which is applied to the finished surface of the work specified in this section is specified in Section 09900 - Painting.
- C. Finish Texture: Level 5, Light Orange Peel, skip trowel not permitted.

2.6 ACCESSORIES

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Wood Framing: ASTM C 1002, Type W for fastening to wood framing, unless otherwise indicated.
 - 2. Cementitious Backer Units: Use screws of type and size recommended by panel manufacturer.
 - 3. Glass Mat Boards: Corrosion resistant fasteners as approved by board manufacturer.
- C. Isolation Strip at Exterior Walls:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.
- D. Sound Attenuation Blankets: As specified in Section 09820 - Acoustical Insulation.
- E. Thermal Insulation: As specified in Section 07210 - Building Insulation.
- F. Acoustical Sealant: As specified in Section 07900 - Joint Sealants.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that site conditions are ready to receive Work and opening dimensions are as instructed by the Manufacturer.

- B. Beginning of installation means acceptance of substrate.

3.2 APPLYING AND FINISHING PANELS - GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Install gypsum 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. Attach gypsum panels to framing provided at openings and cutouts.
- F. Form control and expansion joints with space between edges of adjoining gypsum panels.
- G. Wood Substrate:
 - 1. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members using resilient channels, or provide control joints to counteract wood shrinkage.
 - 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 coffers, joists, and other structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- H. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- I. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
 - 1. Space screws a maximum of 12 inches o.c. for vertical applications.
- J. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

3.3 PANEL APPLICATION METHODS

- A. Single-Layer Application:
 - 1. Ceiling Board Panels: Install across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panel's not less than one framing member.
 - 2. Partitions/Walls: Apply gypsum panels vertically (parallel to framing), to minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - 3. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install at wet locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
 - a. Space fasteners 6 inches o.c. Drive fasteners flush with coated surface. Do not countersink.
2. Cementitious Backer Units: ANSI A108.11, at dry locations indicated to receive tile.
 - a. Fasten units to stud with steel drill screws spaced at not more than 8 inches center to center.
 - b. Fit abutting units with no gap, cover with the fiberglass tape embedded in a skim coat of portland cement mortar.
 - c. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.4 INSTALLATION - 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, as recommended by board manufacturer's recommendations and in accordance with ASTM C840.

3.5 FINISHING GYPSUM BOARD ASSEMBLIES

- 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 those with trim having flanges not intended for tape.
- D. Provide finish of gypsum board surfaces in accordance with the Gypsum Association "Recommended Specification: Levels of Gypsum Board Finish" as follows:
 1. Level 0 (Temporary Construction): No taping, finishing, or accessories required.
 2. Level 1 (Fire Taping at plenum areas above ceiling, in attics, in areas where the assembly will be concealed or in building service corridors and other areas not normally open to public view):
 - a. Joints and interior angles shall have tape embedded in joint compound.
 - b. Surface shall be free of excess joint compound.
 - c. Tool marks and ridges are acceptable.
 3. Level 2 (Tile backer boards):
 - a. Cementitious backer units:
 - 1) Joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating joint compound over joints and interior angles.
 - 2) Fastener heads and accessories shall be covered with a coat of joint compound.
 - 3) Surface shall be free of excess joint compound.
 - 4) Tool marks and ridges are acceptable.
 - 5) Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
 - b. Glass Mat Boards: As recommended by manufacturer.

4. Level 3 (Appearance areas to receive heavy or medium texture (spray or hand applied) finishes before final painting, or where heavy grade wall coverings are to be applied as final decoration. This level of finish is not to be used where smooth painted surface or light to medium wall coverings are to be applied.): NOT USED
5. Level 4 (Appearance areas to receive flat paints, light texture, or where backed wall coverings are to be applied. This level of finish is not to be used where gloss, semi-gloss and enamel paints are to be applied.):
 - a. Joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over flat joints and one separate coat of joint compound applied over interior angles.
 - b. Fastener heads and accessories shall be covered with 3 separate coats of joint compound.
 - c. Joint compound shall be smooth and free of tool marks and ridges.
 - d. Surface to be coated with Drywall Primer as specified herein prior to application of texture.
 - e. Untextured surfaces to be coated with Drywall Primer prior to application of final finishes as specified in Section 09900 – Painting.
6. Level 5 (Appearance areas to receive gloss, semi-gloss, enamel, or nontextured flat paints or where severe lighting conditions occur.):
 - a. Joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over flat joints and one separate coat applied over interior angles.
 - b. Fastener heads and accessories shall be covered with 3 separate coats of joint compound.
 - c. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface to fill imperfections in the joint work, smooth the paper texture and provide a uniform surface for decorating. Excess compound shall be immediately sheared off, leaving a film of skim coating compound completely covering the paper.
 - d. The surface shall be smooth and free of tool marks and ridges.
 - e. Surface to be coated with Drywall Primer as specified herein prior to application of texture.
 - f. Untextured surfaces to be coated with Drywall Primer prior to application of final finishes as specified in Section 09900 - Painting.

3.6 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture finish manufacturer's written recommendations.

3.7 FIELD QUALITY CONTROL

- A. Testing: At Owner's request, Contractor shall provide spot testing of actual properties of steel framing to verify compliance with specifications.

END OF SECTION

SECTION 09310

TILE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Floor and Wall Tile.

1.2 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.6.
 - 2. Step Treads: Minimum 0.6.
 - 3. Ramp Surfaces: Minimum 0.8.

1.3 SUBMITTALS

- A. Product Data: Submit Manufacturer's data for tile and accessory materials, including recommended procedures for mixing materials and setting tile.
- B. Samples for Selection:
 - 1. Tile: Full-size units of manufacturer's standard colors for selection by Architect.
 - 2. Grout: 6 inch sample of manufacturer's standard colors for selection by Architect.
- C. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer indicating that tile complies with ANSI A137.1.
- D. Product Certificates: For each type of product, signed by product manufacturer.
- E. Qualification Data: Submit data indicating installer's compliance with requirements.
- F. Material Test Reports: For each tile-setting and -grouting product.

1.4 QUALITY ASSURANCE

- A. Standards:
 - 1. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
 - 2. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- B. Source Limitations:
 - 1. Tile: Obtain all tile of same type and color or finish from one source or producer. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
 - 2. Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

3. Other Products: Obtain each accessory product specified in this Section through one source from a single manufacturer for each product.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.7 WARRANTY

- A. Warranty: Submit tile, setting material and installation accessory manufacturer's standard warranty against material defects.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match 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.
 2. Grout: Furnish sufficient grout of applicable colors to install extra tile materials furnished.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS

- A. General:
 1. Tile materials shall comply with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
 - a. Provide tile complying with Standard grade requirements, unless otherwise indicated.
 2. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
 3. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.
- B. Restroom, Kitchen:
 1. Floor:
 - a. Size: 8 inches x 8 inches.

- b. Manufacturer: Daltile.
 - c. Style: "Porcelain" or "Sierra."
 - d. Color: As Selected by Architects from Submitted samples.
2. Wall Tile:
- a. Size: 4 inches x 4 inches.
 - b. Manufacturer: Daltile.
 - c. Style: "Matte" or "Semi-Gloss."
 - d. Color: As Selected by Architects from Submitted samples.
3. Base:
- a. Size: 2 inches x 2 inches.
 - b. Manufacturer: Daltile.
 - c. Style: "Keystones" in price group 2.
 - d. Color: As Selected by Architects from Submitted samples.
- C. Lobby, Dining:
1. Floor:
- a. Size: 12 inches x 12 inches. — ? 16x16
 - b. Manufacturer: Daltile.
 - c. Style: "Monticito" or "Brancacci" or "Village Blend."
 - d. Color: As Selected by Architects from Submitted samples.
- D. Trim Shapes: Provide Manufacturer's full selection of trim shapes as required
- 1. Provide all bases, caps, stops, returns, trimmers, and other shapes indicated or required to produce a completely finished installation.
 - 2. Except as may be shown otherwise on the Drawings, provide color and finish matching the adjacent tile.

2.2 SETTING AND GROUTING MATERIALS

- A. Manufacturers: Subject to compliance with requirements, provide products as manufactured by one of the following:
- 1. C-Cure.
 - 2. Custom Building Products.
 - 3. LATICRETE International Inc.
 - 4. MAPEI Corporation.
 - 5. TEC Specialty Products Inc.
 - 6. Others, as approved by tile manufacturer.
- B. Thin Set Mortar: Kerabond/Keralastic as manufactured by MAPEI Corporation. Dry-Set mortar conforming with per ANSI A118.1 with liquid flexible additive to produce a polymer modified mortar conforming to ANSI A118.4.
- C. Polymer-Modified Tile Grout: ANSI A118.7 Polymer type, either ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients, or acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
- 1. Joints 1/8 inch and narrower: Unsanded grout.
 - 2. Joints 1/8 inch and wider: Sanded grout.
 - 3. Color: To be determined.

2.3 ACCESSORIES

- 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. Temporary Protective Coating: Provide one of the products indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 - 1. Petroleum paraffin wax, fully refined and odorless, contains at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
 - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Grout Sealer: Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.
- E. Thresholds: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 - 1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.
 - 2. Marble Thresholds: ASTM C 503, color as selected by Architect, minimum abrasion resistance as required by code, sizes as indicated on Drawings or as required to provide smooth transition between tile and other flooring materials.

2.4 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

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 installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Where tile units will be thin-set directly to the substrata, do not commence installation of the tile units until substrata are within the following tolerances:
 - 1. Horizontal surfaces: Level within 1/8 inch in ten feet in all directions;
 - 2. Vertical surfaces: Level within 1/8 inch in eight feet in all directions.

3. Deflection:
 - a. Vertical Surfaces: Verify that design of the wall or partition will not permit deflection exceeding $1/360$ of the span for point and uniform loading. Space wood or metal studs not less than 16 inches on centers.

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

3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Prepare concrete substrates for tile floors as follows:
 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, 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.
- D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION - GENERAL

- A. General:
 1. 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.
 2. 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.
 3. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 4. Lay out tile wainscots to next full tile beyond dimensions indicated.
- B. Movement Joints: Locate movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 1. Locate joints according to TCA EJ171-03.
 2. Locate joints in tile surfaces directly above joints in concrete substrates.
 3. Prepare joints and apply sealants as specified in Section 07900 – Sealants.

3.4 TILE INSTALLATION

- A. General: Install tile to comply TCA installation methods and ANSI A108 Series of tile installation standards.

- B. Thin Set Installation: Where indicated to be thin-set, install tile using TCA Method for substrate condition and type for latex-portland cement mortar, and as follows:
 - 1. Floor: TCA F113-03
 - 2. Walls:
 - a. Cementitious Backer Unit: TCA W244-03.
 - b. Glass Matt Gypsum Backer Board: W245-03.
- C. Joint Widths: As selected by Architect.
- D. Grout tile to comply with requirements of the following tile installation standards:
 - 1. Ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), Comply with ANSI A108.10.
- E. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.5 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed. Place large, flat boards in walkways and wheelways where use of newly tiled floor is unavoidable.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.
- E. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 09652

SHEET VINYL FLOOR COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Sheet vinyl floor coverings.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's data for each type of product indicated.
- B. Samples for Verification: Submit 2 samples, minimum 6-by-9-inches of each different color and pattern of floor covering required.
- C. Heat-Welded Seam Samples: For each flooring product and welding bead color and pattern combination required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- D. Maintenance Data: For floor coverings to include in maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project that are competent in heat-welding techniques required by manufacturer for floor covering installation.
- B. Regulatory Requirements:
 - 1. Slip resistance of floor surfaces and changes in level shall be in accordance with applicable law.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store floor coverings 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 or more than 90 deg F. Store rolls upright.

1.5 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Install floor coverings after other finishing operations, including painting, have been completed.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below 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 for every 500 linear feet or fraction thereof, in roll form and in full roll width for each color, pattern, and type of floor covering installed.

PART 2 - PRODUCTS

2.1 SHEET VINYL FLOOR COVERING

- A. Products: Subject to compliance with requirements, provide one of following:
 - 1. Armstrong World Industries, Inc..
 - 2. Azrock Commercial Flooring, DOMCO
 - 3. Congoleum Corporation.
 - 4. Mannington Mills, Inc..
 - 5. Marley Flexco (USA), Inc..
 - 6. Tarkett Inc..
- B. Color and Pattern: To be selected by Architect.
- C. Sheet Width: 6 feet minimum.
- D. Seaming Method: Heat welded.
- E. Fire-Test-Response Characteristics:
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit sheet vinyl floor covering and substrate conditions indicated.
- C. Heat-Welding Bead: Solid-strand product of floor covering manufacturer.
 - 1. Color: As approved by Architect or Interior Designer.
- D. Integral-Flash-Cove-Base Accessories:
 - 1. Cove Strip: 1-inch radius provided or approved by floor covering manufacturer.
 - 2. Cap Strip: Square metal, vinyl, or rubber cap provided or approved by floor covering manufacturer.
 - 3. Corners: Metal inside and outside corners and end stops provided or approved by floor covering manufacturer.
- E. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of floor coverings, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 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 floor coverings.

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

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of floor coverings.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 3. Moisture Testing:
 - a. Perform 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. in 24 hours.
 - b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
- C. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 1. Do not install floor coverings until they are same temperature as space where they are to be installed.
- F. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Unroll sheet vinyl floor coverings and allow them to stabilize before cutting and fitting.
- B. Lay out sheet vinyl floor coverings as follows:
 1. Maintain uniformity of floor covering direction.
 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.
 3. Match edges of floor coverings for color shading at seams.
 4. Avoid cross seams.
- C. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- D. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- E. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.

- F. Adhere floor coverings to 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.
- G. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.
- H. Integral Flash Cove Base: Cove floor coverings 6 inches up vertical surfaces, unless otherwise directed by Interior Designer. Support floor coverings at horizontal and vertical junction by cove strip. Butt at top against cap strip.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing floor covering installation:
 - 1. Remove adhesive and other blemishes from floor covering surfaces.
 - 2. Sweep and vacuum floor coverings thoroughly.
 - 3. Damp-mop floor coverings to remove marks and soil.
 - a. Do not wash floor coverings until after time period recommended by manufacturer.
- B. Close spaces to traffic for 48 hours after floor covering installation.
- C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
 - 1. Do not move heavy and sharp objects directly over floor coverings. Place plywood or hardboard panels over floor coverings and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

SECTION 09680

CARPET

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Carpet.
- B. Related Section:
 - 1. Section 09650 – Resilient Wall Base: Resilient wall base and accessories installed with carpet.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated including:
 - 1. Manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Installation recommendations for each type of substrate required.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclose walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
 - 2. Carpet type, color, and dye lot.
 - 3. Seam locations, types, and methods.
 - 4. Type of subfloor.
 - 5. Type of installation.
 - 6. Pattern type, repeat size, location, direction, and starting point.
 - 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 of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet: 12-inch- square Sample.
 - 2. Exposed Edge Stripping and Accessory: 12-inch- long Samples.
- D. Product Schedule: Use same room and product designations indicated on Drawings and in schedules.
- E. Maintenance Data: Include the following information:
 - 1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet.
- F. Certification:
 - 1. At least 30 days prior to scheduled installation, submit certification that carpet will conform to Specifications and approved samples. Manufacturer shall furnish roll numbers and other information which will enable identification of certified carpet. Inspect carpet after manufacture for manufacturing defects
 - 2. Provide certification from manufacturer that carpet will not display or evidence a significant change in color due to exposure to atmospheric contaminants (Ozone or Oxides of Nitrogen) for 5 years.

- G. Test Reports: Submit reports for flammability, smoke density and static propensity from independent laboratory no more than 2 years old.
- H. Environmental Position:
 - 1. Carpet manufacturer to submit:
 - a. Written statement of its Environmental Position and provide documentation of on-going recycling programs, energy conservation programs, reclamation of raw materials and recyclable materials, and Environmental Stewardship programs at local manufacturing site locations.
 - b. Written documentation that a fully established reclamation program is in place at the time of bid.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer with a minimum of 5 years experience in projects similar in scope to this project, who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with CRI 104, Section 5, "Storage and Handling."

1.5 PROJECT CONDITIONS

- A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Field Measurements: Verify installation dimensions by making field measurements.
- D. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.
- E. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.6 WARRANTY

- A. Carpet Warranty: Written warranty, signed by carpet manufacturer agreeing to replace carpet that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

- B. **Manufacturer's Warranty:** In addition to Carpet Warranty, provide manufacturer's Limited 10 Year Wear Warranty on manufacturer's standard form of similar content subject to Architect's approval. Manufacturer's warranty shall include dimensional stability, wear and static resistance.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. **Carpet:** Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

PART 2 - PRODUCTS

2.1 CARPET

- A. **Product:** Mohawk Stati-tuft III Textured Loop, DuPont Antron Legacy Nylon.
 - 1. **Color:** To be selected.

2.2 INSTALLATION ACCESSORIES

- A. **Trowelable Leveling and Patching Compounds:** Latex-modified, hydraulic-cement-based formulation provided by or recommended by the following:
 - 1. Carpet manufacturer.
- B. **Adhesives:** Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and that is recommended by the following:
 - 1. Carpet manufacturer.
- C. **Seaming Cement:** Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- D. **Metal Edge Strips:** Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Verify that substrates and conditions are satisfactory for carpet installation and comply with requirements specified.
- B. **Concrete Subfloors:** Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the following:
 - a. Carpet manufacturer.

2. Subfloor finishes comply with requirements specified in Section 03300 - Cast-in-Place Concrete for slabs receiving carpet.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
4. Test concrete for excessive moisture content or hydro-static moisture content. Excessive moisture is defined as no more than 2.5 pounds per 1000 square feet in 24 hours.
5. Test concrete for acidity/alkalinity which shall test in the 6.0 to 8.0 range.
6. Frequency of tests shall comply with manufacturer's guidelines.

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

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- C. 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 the following:
 1. Carpet manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. General:
 1. Lay carpet materials tight and free of irregularities. Cut and fit carpeting accurately and smoothly on wall and floor surfaces, around projections and into trim strips or binding bars with a minimum number of seams. Install no lengths or fillers which are less than 2'-0" in length. Make installation continuous under removable portable and/or accordion partitions.
 2. Carpet Seams:
 - a. Locate seams in accordance with approved seam diagram.
 - b. Seam layout shall provide a minimum total seam length with minimum head seams.
 - c. Do not locate head seams in areas of heavy traffic.
 - d. Butt match seams in carpeting material with no cut yard ends allowed and with carpet tufting running in same direction throughout Project installation.
 - e. Stagger carpet cross cuts or seams by a minimum of 10 feet.
 - f. Required tapes or adhesives used shall be in strict accordance with carpet and product Manufacturer's recommendations for type of seam, material and use intended.
 3. Edge Strips:
 - a. Install where floor carpeting terminates and where carpeting abuts a dissimilar floor material.
 - b. Securely fasten edge strips with concealed fasteners.
 4. Do not bridge building expansion joints with carpet.
 5. 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.

6. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
7. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
8. Install pattern parallel to walls and borders.
9. Center under doors at doorways.

- B. Direct-Glue-Down Installation: Comply with CRI 104, Section 8, "Direct Glue-Down Installation."
- C. Base: Install base after carpet installation is complete and in accordance with Section 09650 – Resilient Wall Base.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet:
 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 2. Remove yarns that protrude from carpet surface.
 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 15, "Protection of Indoor Installations."
- C. Protect carpet 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 manufacturer.

END OF SECTION

SECTION 09750
STONE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Interior stone for the following:
1. Countertops.

1.2 SUBMITTALS

- A. Product Data: For each variety of stone, stone accessories, and other manufactured products indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples:
1. For each stone type. Include two or more Samples in each set and show the full range of variations in appearance characteristics expected in completed Work.
 2. Submit 2 samples, 6 inches in length, for each color of grout required.
- D. Maintenance data: Submit maintenance data.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An installer who employs experienced stone masons and stone fitters, who are skilled in installing interior stone facing similar in material, design, and extent to that indicated for this Project and whose products have a record of successful in-service performance.

PART 2 - PRODUCTS

2.1 STONE

- A. General:
1. Provide stone that is free of cracks, seams, and starts impairing structural integrity or function.
 2. Provide stone from a single quarry for each variety of stone required.
- B. Stone: As indicated on Finish Schedule, supplied by Arizona Tile.

2.2 ADHESIVES AND SEALANTS

- A. General: Use only adhesives formulated for stone and ceramic tile and recommended by their manufacturer for the application indicated.
- B. Water-Cleanable Epoxy Adhesive: ANSI A118.3.
1. Manufacturers: Subject to compliance with specifications, provide products as manufactured by one of the following:
 - a. Custom Building Products.
 - b. Laticrete International, Inc.
 - c. Mapei Corporation.

- C. Setting Shims: Resilient, non-staining plastic.
- D. Stone Seam Adhesive: 2-part polyester-resin type adhesive designed for joining stone with hairline joints matching color of stone. "Akemi" stone adhesive as manufactured by Wood and Stone, Inc. Manassas, VA, or as approved. Verify compatibility of adhesive with type of stone used.
- E. Sealant for Countertops: Silicone sealant complying with requirements in Section 07900 - Joint Sealants.
 - 1. Color: Clear.

2.3 STONE FABRICATION

- A. General: Fabricate interior stone facing in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings and recommendations in MIA's "Dimensional Stone-Design Manual VI".
- B. Stone Countertops:
 - 1. Seams: Fabricate countertops in sections indicated for joining in field, with sealant-filled seams 1/16 inch in width.
 - 2. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
 - 3. Finish all exposed edges after fabrication to match face finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 - 1. Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect.
 - 2. Commencement of Work will be construed as acceptance of subsurfaces.
 - 3. Verify, before proceeding with this Work that required inspections of existing conditions have been completed.

3.2 PREPARATION

- A. Coordinate erection of stone with work of other trades that adjoin or tie into stone work.
- B. Clean stone surfaces which have become soiled or stained prior to setting to remove soil, stains and foreign materials. Clean by thoroughly scrubbing stones with fiber brushes followed by thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasive.

3.3 INSTALLATION

- A. General
 - 1. Temporarily place and fit units in position to assure accurate fit prior to final setting. Make adjustments as required for level and fit to adjacent construction.
 - 2. Do not lay chipped, cracked, or otherwise defective units. Remove and replace units that are chipped, cracked, broken, or otherwise defective whether before or after setting.

3. Stone Cutting: Avoid field cutting and fitting to the greatest extent possible and obtain approval prior to proceeding. When required and approved, exposed units shall be cut with a power driven Carborundum or diamond disc blade saw or other methods as approved by Architect by skilled stone fitters. When using "wet" cutting methods, clean water shall be used on exposed units.
4. Contiguous Work: Provide reveals and openings as required to accommodate contiguous work.
5. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure interior stone facing in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.
6. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.
7. Seal expansion and other joints as specified in Section 07900 - Joint Sealants.
8. Keep expansion joints free of plaster, mortar, grout, and other rigid materials.

B. Countertops:

1. General: Install countertops over plywood subtops with full spread of water-cleanable epoxy adhesive.
2. Space seams with 1/16-inch gap for filling with sealant. Use temporary shims to ensure uniform spacing and clamp units to temporary bracing to eliminate lipping.
3. Bond seams with stone seam adhesive and draw seam tight and level with clamps to assure tight, level hairline seams matching stone for color and finish. Protect area adjacent to seam by masking.
4. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting.
5. Apply sealant to seams and to gap between countertops and splashes in accordance with Section 07900 - Joint Sealants.

3.4 CONSTRUCTION TOLERANCES

- A. Construction Tolerances: Set stone to comply with the following tolerances:
1. Variation from level: 1/8 inch in 5 feet maximum.
 2. Variation from plumb: 1/16 inch in 12 inches maximum.

3.5 ADJUSTING AND CLEANING

- A. Remove and replace stonework of the following description:
1. Broken, chipped, cracked, stained or otherwise damaged stones.
 2. Defective joints.
 3. Stonework not matching approved samples.
- B. Replace in manner which results in stonework showing no evidence of replacement.
- C. Cleaning: Do not use wire brushes, acid type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods which could damage stone.
- D. Clean countertop not less than 6 days after completion of grouting and pointing, using clean water and soft rags or stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage stone.
- E. Clean up debris, refuse and surplus material and remove from premises.

3.6 PROTECTION

- A. Furnish temporary protection for exposed stone corners and surfaces subject to injury.

END OF SECTION

SECTION 09820
ACOUSTICAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Acoustical insulation as shown on Drawings and as specified.

1.2 DELIVERY, STORAGE AND HANDLING

- A. Protect insulation from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.
- B. Label insulation packages to include material name, production date and/or product code.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products as manufactured by one of the following:
1. Manville Building Products Group
 2. Owens Corning Fiberglas
 3. U.S. Gypsum Company

2.2 MATERIALS

- A. Sound Control Batts: Fiberglass unfaced, ASTM C665, Type 1, Class B.
1. Thickness: 3-1/2 inches unless otherwise indicated on Drawings.
 2. Surface Burning Characteristics: When tested in accordance with ASTM E 84.
 - a. Maximum flame spread: 25
 - b. Maximum smoke developed: 50.
 3. Fire Resistance Ratings: Passes ASTM E 119 as part of a complete fire tested wall assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the section in which substrate and related work is specified.
- B. Obtain installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.
- C. Clean substrates of substances harmful to insulation.

3.2 INSTALLATION

- A. Install acoustical insulation batts in sound-rated stud partition walls where indicated on Drawings. Size batts for a friction fit and install in accordance with Manufacturer's recommendations.
- B. Install acoustical insulation batts above lay-in ceilings, and other locations as shown on Drawings, in strict accordance with Manufacturer's printed instructions.
- C. Butt ends of batts closely together and fill all voids.
- D. Where insulation must extend higher than 8 feet, temporary support can be provided to hold product in place until the finish material is applied.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation and field painting of exposed exterior and interior items and surfaces.

1.2 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 and ASTM D523 apply to this Section.
1. Flat: Lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter. Flat paint shall be "scrubbable" type.
 2. Eggshell: Low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 3. Semigloss: Medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 4. Full gloss: High-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's data for each paint system indicated, including primers. Data shall include label analysis and instructions for handling, storing, and applying each coating material.
- B. Material List: Submit an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
- C. Samples:
1. Architect will furnish Contractor a color schedule, color chips or selected colors prior to commencing work.
 2. Submit samples a minimum of 30 days prior to commencing painting work.
 3. Label and identify each sample as to location and application.
 4. Resubmit as requested by Architect until required sheen, color, and texture are achieved.
 5. Samples shall define each separate coat, including primer.
 6. Submit two 8 inch x 10 inch samples of each color and material specified, including the correct sheen and texture.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
1. ASTM Standards listed in paint manufacturer's technical literature.
 2. UL Ratings listed in paint manufacturer's technical literature.
 3. Federal Specifications listed in paint manufacturer's technical literature.
 4. Local and Federal regulations regarding toxicity and air quality regulations.
- B. Source Limitations: Obtain primers for each coating system from the same manufacturer as the finish coats.

- C. **Manufacturer Qualifications:** Experienced and skilled painters having a minimum 5 years experience with projects and conditions similar in scope to this project.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
 - 1. Protect materials from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.
 - 2. Store materials in manner and quantities that are in strict accordance with local ordinances, state laws, or fire underwriter regulations.

1.6 PROJECT CONDITIONS

- A. **Environmental Requirements:**
 - 1. Apply paints when ambient and surface temperature conforms to manufacturer's recommendations. Do not apply paint in the following conditions:
 - a. Snow, rain, fog, or mist
 - b. When relative humidity exceeds 85 percent
 - c. At temperatures less than 5 deg F above the dew point
 - d. To damp or wet surfaces.

1.7 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to location as instructed by Owner.
 - 1. **Quantity:** Furnish Owner with an additional 3 percent, but not less than 1 gal., of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products from one of the following manufacturers:
 - 1. Dunn Edwards
 - 2. Frazee
 - 3. ICI Dulux Paint Centers
 - 4. Sherwin-Williams Co.
 - 5. Tnemec

2.2 PAINT MATERIALS

- A. **Material Compatibility:** Provide primers, and finish-coat materials that are compatible with one another, and with the substrates indicated, under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

- B. Material Quality: Provide manufacturer's best-quality paint materials, factory formulated and recommended by manufacturer for application indicated.
- C. Colors:
 - 1. Schedule of colors may be based on various manufacturers' color palettes.
 - 2. Manufacturer supplying paint shall match colors.
 - 3. Obtain clarification of intended color at locations where color is not indicated on schedule or drawings.
- D. Schedule of Finishes: Refer to the "Finish Schedule" on the Drawing for designated finishes of areas.
- E. Paint Products: As indicated in Schedule of Paint Products at end of section.

2.3 ACCESSORIES

- A. Application Materials:
 - 1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 - 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
 - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 - 2. Commencement of painting will be construed as Applicator's acceptance of surfaces and conditions.
- B. Test shop applied primer to verify compatibility with cover materials.
- C. Verify moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture contents are at range acceptable to paint manufacturer.

3.2 PREPARATION

- A. General:
 - 1. Prior to commencing painting work, remove and protect hardware, accessories, electrical plates, lighting fixtures and similar items.
 - 2. Mask permanent labels.
 - 3. Surfaces requiring painting or finishing shall be thoroughly dry and cured, free of dirt, dust, rust, stains, scale, mildew, wax, grease, oil, deteriorated substrates, bond-breakers, efflorescence and other foreign matter detrimental to the coating's adhesion and performance.
 - 4. Repair voids, cracks, nicks, and other surface defects, with appropriate patching material. Finish flush with surrounding surfaces and match adjacent finish texture.

- B. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
1. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted.
 - a. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze.
 - b. Use mechanical methods of surface preparation to remove film from hardeners or sealers that may interfere with paint adhesion.
 - c. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - d. Determine alkalinity and moisture content of surfaces by performing appropriate tests. Do not paint surfaces if moisture content or alkalinity exceeds that permitted in manufacturer's written instructions.
 - e. Clean concrete floors indicated to receive paint with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow drying, and vacuuming before painting.
 2. Wood:
 - a. Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces to smooth and dust off.
 - b. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer prior to applying primer.
 - c. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler tinted to match wood color. Sand smooth when dried.
 - d. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
 - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 3. Ferrous Metals:
 - a. Bare Steel:
 - 1) Clean ungalvanized ferrous-metal surfaces that have not been shop primed; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 - 2) Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6.
 - b. Shop Primed Metals:
 - 1) Verify compatibility of primer and finish coats. Provide barrier coats over incompatible primers or remove and reprime.
 - 2) Wire-brush and clean with solvents approved by paint manufacturer
 - 3) Touch-up bare areas and damaged or chipped shop-applied prime coats with the same primer used for shop-applied coat.
 - 4) Remove severely damaged or incompatible prime coats and re-prime, and touch up with same primer as the shop coat.
 4. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- C. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.

- D. Tinting: Manufacturer shall shop tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions.
1. Paint colors, surface treatments, and finishes as indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. Sand lightly between each succeeding enamel or varnish coat.
 5. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 6. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 7. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practical after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Priming will not be required on items delivered with prime or shop coats, unless otherwise specified. Touch up prime coats applied by others as required to ensure an even primed surface before applying finish coat
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
- D. Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Exposed Surfaces: Paint exposed surfaces, except where indicated that the surface or material is not to be painted or is to remain natural. If a finish is not indicated, verify with Architect prior to painting that surface. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
1. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 2. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

- F. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
- G. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- H. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Touch Up for Previously Coated Surfaces:
 - 1. Touch up marred, scraped, and blemished areas of surfaces which were factory primed or previously coated.
 - 2. Properly prepare and touch up scratched, abrasions, and blemishes and remove foreign matter before proceeding with succeeding coats.
 - 3. Feather touch up coating overlapping minimum 2 inches onto adjacent unblemished areas producing smooth, uniform surface.
 - 4. Touch up fasteners, welded surfaces and surrounding, field connections and areas on which shop coat has been abraded or damaged with specified primer before corrosion or other damage occurs from exposure.
- L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
 - 1. Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
 - 2. Testing agency will perform a generic ID test to verify type of product and manufacturer.
 - 3. Testing agency will perform appropriate tests for the following characteristics as required by Owner:
 - a. Quantitative material analysis
 - b. Abrasion resistance
 - c. Apparent reflectivity
 - d. Flexibility
 - e. Washability
 - f. Absorption
 - g. Accelerated weathering
 - h. Dry opacity
 - i. Accelerated yellowness
 - j. Recoating
 - k. Skinning

- l. Color retention
- m. Alkali and mildew resistance
- 4. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

- A. Cleanup:
 - 1. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site. Take precautions to prevent fires.
 - 2. During the course of the Work, remove misplaced paint and stain spots or spills. Leave Work in clean condition acceptable to Architect.
 - 3. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 EXTERIOR PAINT PRODUCTS

- A. Concrete and Stucco: Provide the following finish systems over exterior concrete, stucco and other exterior cementitious substrates as indicated on Drawings:
 - 1. System Description: 2 finish coats over 1 coat primer (if required by finish coat manufacturer).
 - 2. Primer – First Coat

	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a. Dunn Edwards	W709	none
b. Frazee	266	379
c. ICI	3030 Bond-Prep	none
d. Sherwin Williams	A24W300	B46WZ1000
e. Tnemec	151	66
 - 3. Flat - Second and Third Coats

a. Dunn Edwards	W701	
b. Frazee	203	
c. ICI	2210 100% Acrylic Flat Finish	
d. Sherwin Williams	A-100, A6 Series	
e. Tnemec	17	
 - 4. Low-Luster - Second and Third Coats

a. Dunn Edwards	W940	
b. Frazee	126	
c. ICI	2402 100% Acrylic Satin Finish	

- | | | | |
|----|------------------|-------------------|--|
| d. | Sherwin Williams | A-100, A82 Series | |
| e. | Tnemec | 6 | |
5. Semi-gloss - Second and Third Coats
- | | | | |
|----|------------------|-------------------------|----------|
| a. | Dunn Edwards | W901 | 9 Series |
| b. | Frazee | 124 | 628 |
| c. | ICI | 2406 Acrylic Semi-Gloss | 2516 |
| d. | Sherwin Williams | A-100, A8 Series | B55Z600 |
| e. | Tnemec | 30 | 23 |
6. Gloss - Second and Third Coats
- | | | | |
|----|------------------|---------------------------|------|
| a. | Dunn Edwards | W960 | QD60 |
| b. | Frazee | 143 | 648 |
| c. | ICI | 3028 Acrylic Gloss Finish | 4328 |
| d. | Sherwin Williams | B66W100 Series | B54Z |
| e. | Tnemec | 28 | None |
- B. Exterior Ferrous Metals: Provide the following finish systems over exterior ferrous metal.
1. System Description: 2-coats finish over 1-coat primer. Primer is not required on shop-primed items or if not required by finish coat manufacturer.
2. Primer – First Coat (provide red or white color as appropriate for finish coat color)
- | | | <u>Waterborne (100% Acrylic)</u> | <u>Solventborne</u> |
|----|------------------|----------------------------------|---------------------|
| a. | Dunn Edwards | Intercryl-520 | 43-4 |
| b. | Frazee | 1561 | 661 |
| c. | ICI Dulux | 4020 | 4160 |
| d. | Sherwin Williams | B66-310 | B50Z Series |
| e. | Tnemec | 18 | 66 |
3. Flat – Second and Third Coat
- | | | | |
|----|------------------|-------------------------------|-----|
| a. | Dunn Edwards | W704 | --- |
| b. | Frazee | 203 | --- |
| c. | ICI Dulux | 2200 100% Acrylic Flat Finish | --- |
| d. | Sherwin Williams | A-100 Latex Flat A6 Series | --- |
| e. | Tnemec | 115 | --- |
4. Low-Luster - Second and Third Coat
- | | | | |
|----|------------------|--------------------------------|-----|
| a. | Dunn Edwards | W940 | --- |
| b. | Frazee | 126 | --- |
| c. | ICI Dulux | 2402 100% Acrylic Satin Finish | --- |
| d. | Sherwin Williams | A-100, A82 Series | --- |
| e. | Tnemec | 18 | 175 |
5. Semi-gloss – Second and Third Coat
- | | | | |
|----|------------------|------------------------------|----------|
| a. | Dunn Edwards | W901 | 9 Series |
| b. | Frazee | 124 | 628 |
| c. | ICI Dulux | 2406 100% Acrylic Semi-Gloss | 2516 |
| d. | Sherwin Williams | A-100 Latex Gloss A8 Series | B55Z600 |
| e. | Tnemec | 30 | 75 |
6. Gloss - Second and Third Coat
- | | | | |
|----|------------------|-----------------------------|-----------|
| a. | Dunn Edwards | W960 | 10 Series |
| b. | Frazee | 143 | 648 |
| c. | ICI Dulux | 3028 Acrylic Gloss Finish | 4328 |
| d. | Sherwin Williams | B66W100 DTM Acrylic Coating | B54Z |
| e. | Tnemec | 28 | 74 |

C. Exterior Galvanized Metals: Provide the following finish systems over exterior galvanized metal surfaces:

1. System Description: 2-coats finish over 1-coat primer. Primer is not required on shop-primed items or if not required by finish coat manufacturer.

2. Primer – First Coat	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a. Dunn Edwards	W713	42-44
b. Frazee	561	661
c. ICI Dulux	4020	4160
d. Sherwin Williams	B66W1	B50WZ30
e. Tnemec	18	27

3. Flat – Second and Third Coat

a. Dunn Edwards	W704	---
b. Frazee	203	---
c. ICI Dulux	2200 100% Acrylic Flat Finish	---
d. Sherwin Williams	A-100 Latex Flat A6 Series	---
e. Tnemec	115	---

4. Low-Luster - Second and Third Coat

a. Dunn Edwards	W940	---
b. Frazee	126	---
c. ICI Dulux	2402 100% Acrylic Satin Finish	---
d. Sherwin Williams	A-100, A82 Series	---
e. Tnemec	18	175

5. Semi-gloss – Second and Third Coat

a. Dunn Edwards	W901	9 Series
b. Frazee	124	628
c. ICI Dulux	2406 100% Acrylic Semi-Gloss	2516
d. Sherwin Williams	A-100 Latex Gloss A8 Series	B55Z600
e. Tnemec	30	73

6. Gloss - Second and Third Coat

a. Dunn Edwards	W960	10 Series
b. Frazee	143	648
c. ICI Dulux	3028 Acrylic Gloss Finish	4328
d. Sherwin Williams	B66W100 DTM Acrylic Coating	B54Z
e. Tnemec	28	74

D. Exterior Aluminum: Provide the following finish systems over exterior aluminum surfaces:

1. System Description: 2-coats finish over 1-coat primer. Primer is not required on shop-primed items or if not required by finish coat manufacturer.

2. Primer – First Coat	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a. Dunn Edwards	W713	42-44
b. Frazee	561	661
c. ICI Dulux	4020	4160
d. Sherwin Williams	B66W1	B50WZ30
e. Tnemec	18	27

3. Flat – Second and Third Coat

a. Dunn Edwards	W704	---
b. Frazee	203	---
c. ICI Dulux	2200 100% Acrylic Flat Finish	---
d. Sherwin Williams	A-100 Latex Flat A6 Series	---
e. Tnemec	115	---

4.	Low-Luster - Second and Third Coat		
a.	Dunn Edwards	W940	---
b.	Frazee	126	---
c.	ICI Dulux	2402 100% Acrylic Satin Finish	---
d.	Sherwin Williams	A-100, A82 Series	---
e.	Tnemec	18	175
5.	Semi-gloss - Second and Third Coat		
a.	Dunn Edwards	W901	9 Series
b.	Frazee	124	628
c.	ICI Dulux	2406 100% Acrylic Semi-Gloss	2516
d.	Sherwin Williams	A-100 Latex Gloss A8 Series	B55Z600
e.	Tnemec	30	73
6.	Gloss - Second and Third Coat		
a.	Dunn Edwards	W960	10 Series
b.	Frazee	143	648
c.	ICI Dulux	3028 Acrylic Gloss Finish	4328
d.	Sherwin Williams	B66W100 DTM Acrylic Coating	B54Z
e.	Tnemec	28	74

3.8 INTERIOR PAINT PRODUCTS

- A. Interior Ferrous Metals: Provide the following finish systems over interior ferrous metal.
1. System Description: 2-coats finish over 1-coat primer. Primer is not required on shop-primed items or if not required by finish coat manufacturer.
 2. Primer - First Coat (provide red or white color as appropriate for finish coat color)

	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a. Dunn Edwards	Intercryl-520	43-5
b. Frazee	561	661
c. ICI Dulux	4020	4160
d. Sherwin Williams	B66-310	B50Z Series
e. Tnemec	18	10-99
 3. Flat - Second and Third Coat

	<u>Waterborne (Vinyl Acrylic)</u>	<u>Solventborne</u>
a. Dunn Edwards	W420	---
b. Frazee	011	---
c. ICI Dulux	1210	1310
d. Sherwin Williams	ProMar 200, B30W200 Series	B32WZ1101
e. Tnemec	115	---
 4. Low-Luster - Second and Third Coat (eggshell)

	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a. Dunn Edwards	W940	71 Series
b. Frazee	126 (low sheen)	---
c. ICI Dulux	1402	1512
d. Sherwin Williams	B20W200	B33WZ1101
e. Tnemec	18	175
 5. Semi-gloss - Second and Third Coat

	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a. Dunn Edwards	W901	9 Series
b. Frazee	128	328
c. ICI Dulux	1407	1507
d. Sherwin Williams	B42-100	B55Z600
e. Tnemec	30	73

6. Gloss - Second and Third Coat

	Waterborne (100% Acrylic Non blocking)	Solventborne
a. Dunn Edwards	W960	10 Series
b. Frazee	143	648
c. ICI Dulux	3028 Acrylic Gloss Finish	4328
d. Sherwin Williams	B66-100	B54Z
e. Tnemec	28	74

B. Interior Galvanized Metals: Provide the following finish systems over interior galvanized metal surfaces:

1. System Description: 2-coats finish over 1-coat primer. Primer is not required on shop-primed items or if not required by finish coat manufacturer.

2. Primer – First Coat	Waterborne (100% Acrylic)	Solventborne
a. Dunn Edwards	W713	42-44
b. Frazee	561	661
c. ICI Dulux	4020	4160
d. Sherwin Williams	B66W1	B50WZ30
e. Tnemec	18	27

3. Low-Luster - Second and Third Coat (eggshell)

	Waterborne (100% Acrylic)	Solventborne
a. Dunn Edwards	W440	71 Series
b. Frazee	126 (low sheen)	---
c. ICI Dulux	1402	1512
d. Sherwin Williams	B20W200	B33WZ1101
e. Tnemec	18	175

4. Semi-gloss – Second and Third Coat

	Waterborne (100% Acrylic)	Solventborne
a. Dunn Edwards	W901	9 Series
b. Frazee	128	328
c. ICI Dulux	1407	1507
d. Sherwin Williams	B42-100	B55Z600
e. Tnemec	30	73

5. Gloss - Second and Third Coat

	Waterborne (100% Acrylic Non blocking)	Solventborne
a. Dunn Edwards	W960	10 Series
b. Frazee	143	648
c. ICI Dulux	3028 Acrylic Gloss Finish	4328
d. Sherwin Williams	B66-100	B54Z
e. Tnemec	28	74

C. Interior Aluminum: Provide the following finish systems over interior aluminum surfaces:

1. System Description: 2-coats finish over 1-coat primer. Primer is not required on shop-primed items or if not required by finish coat manufacturer.

2. Primer – First Coat	Waterborne (100% Acrylic)	Solventborne
a. Dunn Edwards	W713	42-44
b. Frazee	561	661
c. ICI Dulux	4020	4160
d. Sherwin Williams	B66W1	B50WZ30
e. Tnemec	18	27

3.	Low-Luster - Second and Third Coat (eggshell)		
		<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a.	Dunn Edwards	W940	71 Series
b.	Frazee	126 (low sheen)	---
c.	ICI Dulux	1402	1512
d.	Sherwin Williams	B20W200	B33WZ1101
e.	Tnemec	180	175

4.	Semi-gloss – Second and Third Coat		
		<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a.	Dunn Edwards	W901	9 Series
b.	Frazee	128	328
c.	ICI Dulux	1407	1507
d.	Sherwin Williams	B42-100	B55Z600
e.	Tnemec	30	73

5.	Gloss - Second and Third Coat		
		<u>Waterborne (100% Acrylic Non blocking)</u>	<u>Solventborne</u>
a.	Dunn Edwards	W960	QD60
b.	Frazee	143	648
c.	ICI Dulux	3028 Acrylic Gloss Finish	4328
d.	Sherwin Williams	B66-100	B54Z
e.	Tnemec	28	74

D. Interior Gypsum Board, Plaster and Concrete - Wet Areas (epoxy): Apply to gypsum board, plaster and concrete surfaces in toilet rooms, janitor rooms, kitchens, areas subject to moisture and other areas as scheduled.

1. System Description: 2-coats finish over 1-coat primer.

2.	Primer – First Coat	<u>Waterborne (Acrylic)</u>	
a.	Dunn Edwards	W6232	
b.	Frazee	Sierra S30	Amercoat 385
c.	ICI	3210	
d.	Sherwin Williams	Harmony B11W900	
e.	Tnemec	130	

3.	Low-Luster - Second and Third Coat (eggshell)		
		<u>Waterborne (Acrylic)</u>	
a.	Dunn Edwards	W7400 or W540	
b.	Frazee	Sierra S22	Amercoat 385
c.	ICI	1402	
d.	Sherwin Williams	Epo-Plex Low Luster B71-100	
e.	Tnemec	113	

4.	Semi-gloss – Second and Third Coat		
		<u>Waterborne (Acrylic)</u>	
a.	Dunn Edwards	W7500 or W550	
b.	Frazee	Sierra S16	Amerlock 400
c.	ICI	4406	
d.	Sherwin Williams	B70/B60V25	
e.	Tnemec	14	

5.	Gloss - Second and Third Coat		
		<u>Waterborne (Acrylic Non blocking)</u>	
a.	Dunn Edwards	W7600	
b.	Frazee	Amercoat 335	Sierra S40

c.	ICI	4408	4508
d.	Sherwin Williams	B73-100/B73V100	
e.	Tnemec	28	

E. Interior Gypsum Board, Plaster and Concrete - Non-Wet Areas: Apply to gypsum board, plaster and concrete except for wet areas.

1.	Primer – First Coat	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a.	Dunn Edwards	W102	E28-1
b.	Frazee	061	367
c.	ICI Dulux	1000	1110
d.	Sherwin Williams	B28W200	B49WZ2(do not use over concrete)
e.	Tnemec	51-792	66
2.	Low-Luster - Second and Third Coat (eggshell)	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a.	Dunn Edwards	W 440	71 Series
b.	Frazee	126 (low sheen)	—
c.	ICI Dulux	1403	1512
d.	Sherwin Williams	B20W200	B33WZ1101
e.	Tnemec	180	—
3.	Semi-gloss – Second and Third Coat	<u>Waterborne (100% Acrylic)</u>	<u>Solventborne</u>
a.	Dunn Edwards	W450	9 Series
b.	Frazee	128	328
c.	ICI Dulux	1406	1507
d.	Sherwin Williams	B42-100	B55Z600
e.	Tnemec	113	66
4.	Gloss - Second and Third Coat	<u>Waterborne (100% Acrylic Non blocking)</u>	<u>Solventborne</u>
a.	Dunn Edwards	W960	10 Series
b.	Frazee	143	648
c.	ICI Dulux	3028 Acrylic Gloss Finish	4328
d.	Sherwin Williams	B66-100	B54Z
e.	Tnemec	114	84

END OF SECTION

SECTION 10305

MANUFACTURED FIREPLACES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Manufactured fireplaces and accessory items as shown on Drawings and as specified.

1.2 SUBMITTALS

- A. Product Data: Submit Manufacturer's specifications and installation instructions.
- B. Shop Drawings: Submit drawings showing space requirements, and piping and wiring rough-in locations for gas, power, and vents.
- C. Samples: Submit samples or brochures showing color selection.
- D. Operating and Maintenance: Submit 2 copies of Manufacturer's instructions for operating and maintaining equipment.

1.3 QUALITY ASSURANCE

- A. Qualifications: Provide installation by a manufacturer qualified and authorized installer.
- D. Certifications: Provide gas-burning fireplaces that carry the design certification seal of the AGA and that comply with ANSI Z223.1 (NFPA54).
- E. Provide electrical components required as part of manufactured fireplaces that are listed and labeled by UL and that comply with applicable NEMA standards.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.
- B. Storage: Adequately protect against damage while stored at the site.
- C. Handling: Comply with Manufacturer's instructions.

1.5 WARRANTY

- A. Furnish Manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURED FIREPLACES

- A. Manufactured Units:
 - 1. Manufacturer: Specifications are based on ISOKERN Fireplace and Chimney Systems, distributed by Earthcore Industries, Inc., Jacksonville, Florida, 800-642-2920

2. Fireplace Units: Modular refractory masonry precast fireplace designed for field assembly. Provide components required by manufacturer for a complete firebox and smoke dome.

B. Fireplace Materials:

1. Lightweight concrete mixture of Icelandic volcanic pumice aggregate and aluminate cement for precast firebox, chimney block and flue components.
 - a. Compressive Strength:
 - 1) Firebox and Chimney Block: 972 psi.
 - 2) Flue Liner: 1175 psi.
2. Premixed (dry) ISOKERN LIP mortar, masonry adhesive, comply with ASTM 4826 IT.
 - a. Tensile Strength: 807 psi.
 - b. Compressive Strength: 2460 psi.
3. Damper: Cast Iron.
4. Refractory Brick: As required by fireplace manufacturer.

- C. Flue: Insulated metal, Class "A" metal flue, conforming to UL 103 and as approved by fireplace manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Verify rough openings and framing are adequate for minimum required clearances from combustion chamber and vents. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

- A. Install manufactured fireplaces and accessory items at locations shown on Drawings in accordance with Manufacturer's instructions.
- B. Connect equipment to power and gas rough-ins as applicable. Securely fasten built-in items where required. Install with all minimum required clearances met or exceeded. Completely conceal rough openings.

3.3 FIELD QUALITY CONTROL

- A. Tests: Test and adjust fireplace for proper operation and combustion.

3.4 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 10350

FLAGPOLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Aluminum flagpoles.
- B. Related Sections:
 - 1. Section 03300 - Cast-in-Place Concrete: Concrete footings for flagpoles.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide flagpoles capable of withstanding the effects of wind loads as determined according to the building code in effect for this Project or NAAMM FP 1001, "Guide Specifications for Design Loads of Metal Flagpoles," whichever is more stringent.

1.3 SUBMITTALS

- A. Product Data: For each type of flagpole required. Include installation instructions.
- B. Shop Drawings: Show general layout, jointing, grounding method, and anchoring and supporting systems.
 - 1. Include details of foundation system for ground-set poles.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each flagpole as a complete unit from a single manufacturer, including fittings, accessories, bases, and anchorage devices.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Spiral wrap flagpoles with heavy kraft paper or other weathertight wrapping and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Baartol Co., Inc.
 - 2. Concord Industries, Inc.
 - 3. ICC Manufacturing Co.; Morgan-Francis Div.; AABEC Pole Div.
 - 4. Kearney-National Inc.; American Flagpole Div.
 - 5. Lingo, Inc.; Acme Flagpole Co. Div.

2.2 FLAGPOLES

- A. Pole Construction, General: Construct poles and ship to Project site in one piece, if possible. If more than one piece is necessary, provide snug-fitting precision joints with self-aligning, internal splicing sleeve arrangement for weathertight, hairline field joints.
- B. Aluminum Flagpoles: Fabricate from seamless, extruded tubing complying with ASTM B 241, alloy 6063, with a minimum wall thickness of 3/16 inch. Heat treats after fabrication to comply with ASTM B 597, temper T6.
 - 1. Provide cone-tapered aluminum flagpoles.
- C. Foundation Tube: Galvanized corrugated-steel foundation tube, 0.0635-inch minimum wall thickness, sized to suit flagpole and installation. Provide with 3/16-inch steel bottom plate and support plate; 3/4-inch- diameter, steel ground spike; and steel centering wedges all welded together. Galvanize steel parts, including foundation tube, after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole.

2.3 FITTINGS

- A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match pole-butt diameter.
 - 1. 0.063-inch spun aluminum.
- B. External Halyard: Ball-bearing, nonfouling, revolving truck assemblies of cast metal with continuous 5/16-inch- diameter, braided polypropylene halyards and 9-inch cast-metal cleats with fasteners. Finish exposed metal surfaces to match flagpole.
 - 1. Provide 2 halyards and 2 cleats at each flagpole.
 - 2. Provide cast-metal cleat covers, finished to match flagpole, secured with cylinder locks.
 - 3. Provide halyard protectors consisting of a 2-inch channel, 60 inches long, finished to match flagpole.
- C. Halyard Flag Snaps: Provide 2 swivel snap hooks per halyard, as follows:
 - 1. Stainless steel.
 - 2. Provide with neoprene or vinyl covers.

2.4 MISCELLANEOUS MATERIALS

- A. Concrete: Comply with requirements of Section 03300 - Cast-in-Place Concrete.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Aluminum: Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
 - 1. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare in-ground flagpoles by painting below-grade portions with a heavy coat of bituminous paint.
- B. Excavation: For foundation, excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete.
- C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure forms, foundation tube, fiberglass sleeve, or anchor bolts in position, braced to prevent displacement during concreting.
- D. Place concrete immediately after mixing. Compact concrete in place by using vibrators. Moisture cure exposed concrete for not less than 7 days or use a nonstaining curing compound.
- E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to base perimeter.

3.2 FLAGPOLE INSTALLATION

- A. General: Install flagpoles where shown and according to Shop Drawings and manufacturer's written instructions.
- B. Foundation-Tube Installation: Install flagpole in foundation tube, seated on bottom plate between steel centering wedges. Plumb flagpole and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric sealant and cover with flashing collar.
- C. Electrically ground flagpole installation.

END OF SECTION

SECTION 10400

SIGNS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Interior directional signage as required by code.
 - 2. Signage accessories.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.
- B. Shop Drawings: Include plans, elevations, and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.
 - 1. Provide message list for each sign, including large-scale details of wording, lettering, and braille layout.
- C. Samples: For each type of sign, include the following Samples to verify color selected:
 - 1. Panel Signs: Full-size Samples of each type of sign required.
- D. Qualification Data: For Installer.
- E. Maintenance Data: For signage cleaning and maintenance requirements to include in maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by signage manufacturer or an authorized representative of signage manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain each sign type through one source from a single manufacturer.
- C. Regulatory Requirements: Regulatory Requirements: Comply with the following:
 - 1. ANSI A117.1 "Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People."
 - 2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
 - 3. ADA Accessibility Guidelines (ADAAG).
 - 4. The Arizonans with Disabilities Act of 1992 Administrative Rules (AzDAAG).

1.4 PROJECT CONDITIONS

- A. Field Measurements: Where sizes of signs are determined by dimensions of surfaces on which they are installed, verify dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PANEL SIGNS

- A. Interior Signage: All interior signage shall comply with applicable ADA requirements.
 - 1. Base: Melamine plastic laminate, 1/8 inch thick, rated non-static, fire retardant and self extinguishing.
 - a. Colors: As selected by Architect and in accordance with local and Federal requirements
 - b. Mounting: Screw attach to wall or door or door frame as indicated by Construction Manager. Minimum 2 screws per sign. Height shall be 60 inches above finish floor to centerline of sign at wall mounted signs.
 - c. Finish: Matte finish.
 - d. Contrast: Characters shall contrast with background by at least 20 percent.
 - 2. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Produce precisely formed characters with square cut edges free from burrs and cut marks.
 - a. Letters and Number: Raised 1/32 inch upper case, sans serif or simple serif, and accompanied with Grade 2 Braille. Raised characters shall be at least 5/8 inch high, but not higher than 2 inches.
 - b. Width-to-height ratio: From 3:5 to 1:1, and stroke width-to-height ratio from 1:5 to 1:10.
 - 3. Text: Required quantity of each sign shall be as directed by Architect.

2.2 ACCESSORIES

- A. Mounting Methods: Use double-sided vinyl tape or silicone adhesive fabricated from materials that are not corrosive to sign material and mounting surface.
- B. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that items, including anchor inserts, and electrical power provided under other sections of Work are sized and located to accommodate signs.
- C. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.
1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using one of the methods indicated below as appropriate to substrate and as approved by Architect and sign manufacturer:
1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
 2. Silicone-Adhesive Mounting: Use liquid-silicone adhesive recommended in writing by sign manufacturer to attach signs to irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended in writing by sign manufacturer to hold sign in place until adhesive has fully cured.
 3. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
 4. Where panel signs are scheduled or indicated to be mounted on glass, provide matching plate on opposite side of glass to conceal mounting materials.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION

SECTION 10506
WOOD LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Wood lockers with plastic laminate facing.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for wood lockers.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 2. Show locations and sizes of cutouts and holes for items installed in wood lockers.
 3. Show wood locker fillers, trim, base, sloping tops, and accessories.
 4. Show wood locker numbering sequence.
- C. Samples: Submit the following:
1. Plastic-laminate-clad panels, not less than 8 by 10 inches, Manufacturers Standard color, for Architect's selection.
 2. Corner pieces of wood locker front frame joints between stiles and rail, as well as exposed end pieces, not less than 18 inches high by 18 inches wide by 6 inches deep.
- D. Qualification Data: For Installer and manufacturer.
- E. Research/Evaluation Reports: Showing that fire-retardant-treated wood complies with building code in effect for Project.
- F. Maintenance Data: For adjusting, repairing, and replacing wood locker doors and latching mechanisms to include in maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain wood lockers through one source from a single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of wood lockers and are based on the specific system indicated.
- D. Regulatory Requirements: Where wood lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
1. Provide not less than one shelf located within required reach ranges.
 2. Provide hardware that does not require tight grasping, pinching, or twisting of the wrist, and that operates with a force of not more than 5 lbf.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver wood lockers until painting and similar operations that could damage wood lockers have been completed in installation areas. If wood lockers must be stored in other-than-installation areas, store only in areas where environmental conditions are same as that in final installation location and comply with requirements specified in "Project Conditions" Article.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install wood lockers 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.
- B. Field Measurements: Verify concealed framing, blocking, and reinforcements that support wood lockers by field measurements before being enclosed and before wood locker fabrication, and indicate measurements on Shop Drawings.

1.6 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of wood lockers that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures.
 - 2. Faulty operation of locks or hardware.
 - 3. Deterioration of wood, wood finishes, and other materials beyond normal use.
- B. Warranty Period: 3 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ideal Products, Inc.
 - 2. Classic Woodworking, Inc.
 - 3. Hollman, Inc.
- B. Basis of Design: 1000 Series as manufactured by Ideal.

2.2 MATERIALS

- A. Medium-Density Fiberboard: ANSI A208.2, Grade MD-Exterior Glue.
- B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue, minimum 45-lb/cu. ft. density.
- C. Softwood Plywood: DOC PS 1, Medium Density Overlay.
- D. Hardwood Plywood: HPVA HP-1, Type I.
- E. Thermoset Decorative Overlay (melamine): Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as follows:
 - 1. Horizontal Surfaces: HGS.
 - 2. Postformed Surfaces: HGP.
 - 3. Vertical Surfaces: VGS.
 - 4. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
 - a. Avonite, Inc.
 - b. Formica Corporation.
 - c. Wilsonart International; Div. of Premark International, Inc.
 - 5. Colors:
 - a. Interiors: Manufacturer's standard.
 - b. Exterior: As selected by Architect.
- G. Edges: 13/16 inch convex face, polyethylene vinyl T-molding.
- H. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- I. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.

2.3 WOOD LOCKER HARDWARE

- A. General: Provide manufacturer's standard wood locker hardware and accessories complying with the following:
- B. Hinges: 180 degree opening, 2-3/4 inch exposed 5-knuckle, black finish.
 - 1. Provide 2 hinges for doors 42 inches tall and less.
 - 2. Provide 3 hinges for doors more than 42 inches tall.
- C. Knobs: Metal; back mounted; 1-1/2-inch- diameter, flat round shape.
- D. Locks: Padlock hasps, surface mounted, cadmium plated steel.
- E. Number Discs: 1-1/4 inch diameter, 1/4 inch numerals, recessed flush in door
- F. Exposed Hardware Finishes: Satin chrome. ~ ?

2.4 PLASTIC-LAMINATE-FACED WOOD LOCKERS

- A. Configuration: 12 inches wide, 18 inches deep, x 30 inches high.
- B. Lockers: Plastic laminate over Medium Density Fiberboard or 48 lb. Industrial grade particle board.
- C. End Panels: Match style, material, construction, and finish of wood doors.

2.5 WOOD LOCKER FABRICATION

- A. Fabricate components square, rigid, without warp, and with finished faces flat and free of scratches and chips. Accurately machine components for attachments in factory, with no chips. Make joints tight and true.

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, floors, and wood bases for suitable conditions where wood lockers will be installed.
- B. Verify that furring is attached to concrete and masonry walls that are to receive wood lockers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Condition wood lockers to average prevailing humidity conditions in installation areas before installation.
- B. Before installing wood lockers, examine factory-fabricated work for completeness and complete work as required, including removal of packing.

3.3 INSTALLATION

- A. Install concealed wood support base.
- B. Install level, plumb, and true; shim as required, using concealed shims.
- C. Connect groups of wood lockers together with manufacturer's standard fasteners, through predrilled holes, with no exposed fasteners on face frames. Fit wood lockers accurately together to form flush, tight, hairline joints.
- D. Install wood lockers 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. Installation Tolerance: No more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line. Shim as required with concealed shims.
 - 2. Secure units to wall through back of units through gypsum board to solid blocking or wall studs and to substrate with suitable anchors to resist 100 pounds pullout force. Anchor units through locker floor to base. Anchor units side to side through pre-drilled holes with manufacturer's standard fasteners.
- E. Scribe and cut corner and filler panels to fit adjoining work using fasteners concealed where practical. Repair damaged finish at cuts.
- F. Attach sloping top units to wood lockers, with end panels covering exposed ends.

3.4 ADJUSTING AND CLEANING

- A. Clean, lubricate, and adjust hardware. Adjust doors to operate easily without binding. Verify that integral locking devices operate properly.
- B. Protect wood lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit wood locker use during construction.
- C. Touch up marred finishes, or replace wood lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by wood locker manufacturer.

END OF SECTION

SECTION 10520

FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Portable fire extinguishers
 - 2. Fire-protection cabinets.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.
 - 1. Fire Extinguishers: Include rating and classification.
 - 2. Cabinets: Include door hardware, cabinet type, trim style, panel style, and details of installation.
- B. Samples: For each exposed cabinet finish.

1.3 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1.4 COORDINATION

- A. Coordinate size of cabinets to ensure that type and capacity of hoses, hose valves, and hose racks indicated are accommodated.

PART 2 - PRODUCTS

2.1 PORTABLE FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers for each cabinet and other locations indicated.
 - 1. Mounting Brackets: Manufacturer's standard steel, designed to secure extinguisher indicated and with plated or baked-enamel finish.
 - 2. Identification: Lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location. Locate as directed by Architect.
 - a. Identify bracket-mounted extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to wall surface.
- B. Extinguisher: Multipurpose Dry-Chemical Type, UL-rated 2-A:10:B:C, 5-lb nominal capacity, in enameled-steel container.

2.2 FIRE-PROTECTION CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. J. L. Industries, Inc.
 2. Larsen's Manufacturing Company.
 3. Potter-Roemer, Div. of Smith Industries, Inc.
- B. Fire Protection Cabinet:
1. Cabinet: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
 - a. Fire-Rated Cabinets: Listed and labeled to meet requirements in ASTM E 814 for fire-resistance rating of wall where it is installed.
 - b. Cabinet Metal: Enameled-steel sheet, white baked enamel finish.
 2. Mounting: Semi- Recessed.
 3. Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.
 - a. Material: Steel sheet.
 4. Door:
 - a. Material: Steel sheet.
 - b. Glazing Style: Vertical Duo.
 - c. Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
 - 1) Provide inside latch and lock for break-glass panels.
 - d. Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.
 - e. Door Locks: Provide cylinder lock, with all cabinets keyed alike.
 5. Identification: Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location. Locate as directed by Architect.
 - a. Identify fire extinguisher in cabinet with the words "FIRE EXTINGUISHER" applied to door.
 - 1) Lettering Color: Black.
 - 2) Orientation: Vertical.
- C. Wall Bracket: Manufacturer's standard J-type for wall hung extinguishers.

2.3 FINISHES

- A. Steel Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Minimum dry film thickness of 2 mils.
1. Color: White.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine roughing-in for hose valves, hose racks, and cabinets to verify actual locations of piping connections before cabinet installation.

- B. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets are to be installed.
- C. Examine fire extinguishers for proper charging and tagging. Remove and replace damaged, defective, or undercharged units.
- D. Install in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
 - 1. Prepare recesses for cabinets as required by type and size of cabinet and trim style.
 - 2. Fasten mounting brackets to structure and cabinets, square and plumb.
 - 3. Fasten cabinets to structure, square and plumb.
- E. Adjust cabinet doors that do not swing or operate freely.
- F. Refinish or replace cabinets and doors damaged during installation.
- G. Place extinguishers in cabinets and on wall brackets.

END OF SECTION

SECTION 10650

OPERABLE PANEL PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Manually operated, continuously hinged panels.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
1. Sound Transmission Requirements: Operable panel partition assembly tested in a full-scale opening, 14 by 9 feet, for laboratory sound transmission loss performance according to ASTM E 90, determined by ASTM E 413
 - a. STC rating: 40.
 2. Noise Reduction Requirements: Operable panel partition assembly, identical to partition tested for STC, tested for sound absorption performance according to ASTM C 423 and rated for not less than the NRC indicated.

1.3 SUBMITTALS

- A. Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable panel partition, component, and accessory specified. Include data on acoustical performance, surface-burning characteristics, and durability.
- B. Shop Drawings: Show location and extent of operable panel partitions. Include plans, elevations, sections, details, numbered panel installation sequence, attachments to other construction, and accessories. Indicate dimensions; weights; conditions at openings and for storage; and required installation, storage, and operating clearances. Indicate location and installation requirements for hardware and track, and direction of travel. Show blocking to be provided by others. Include the following:
1. Calculations: Calculate requirements for supporting operable panel partitions and verify capacity of carriers and track components to support loads; indicate deflection limits for partition and adjacent construction.
- C. Setting Drawings: For embedded items and cutouts required in other work, including support beam punching template.
- D. Samples: For each type of exposed finish required, prepared on Samples of size indicated below and of same thickness and material indicated for the Work.
1. Panel Face Material: Manufacturer's standard-size unit, not less than 3 inches square.
- E. Product Certificates: Signed by manufacturers of operable panel partitions certifying that products furnished comply with requirements.
- F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- G. Product Test Reports: From a qualified testing agency indicating that each operable panel partition complies with requirements, based on comprehensive testing of current products.
- H. Maintenance Data: For the following to include in maintenance manuals specified in Division 1:
 - 1. Panel face finishes and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
 - 2. Seals, hardware, track, carriers, and other operating components.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified in writing by the operable panel partition manufacturer as qualified to install the manufacturer's partition systems for work similar in material, design, and extent to that indicated for this Project.
- B. Fire-Test-Response Characteristics: Provide operable panel partitions with the following fire-test-response characteristics, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: As follows, per ASTM E 84:
 - a. Flame Spread: 25 or less.
 - b. Smoke Developed: 450 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.
- B. Storage: Adequately protect against damage while stored at the site.
- C. Handling: Comply with Manufacturer's instructions.
- D. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify operable panel partition openings and storage arrangements by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening and storage dimensions and proceed with fabricating operable panel partitions without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hufcor Inc.
 - 2. Modernfold, Inc.

3. Panelfold, Inc.
4. Curtition.

B. Basis of Design: Acousti-Seal 933 as manufactured by Modernfold.

2.2 OPERABLE PANEL PARTITIONS

A. Panel Construction:

1. Frames: 16 gauge painted steel formed to capture and protect vertical edges of the face material.
2. Panel Skin: 1/2 inch gypsum board, class "A" rated, continuously bonded to panel frame.
3. Panel weigh: 8 lb / sq. ft.

B. Facing:

1. General: Provide finish facings that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.
2. Type: Fabric.
3. Color: As selected by Architect.

C. Seals: Seals shall fit tight at contact surfaces and seal continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended, closed, and in place.

1. Vertical: Vertical interlock seals between panels shall be dual durometer polyvinylchloride in a tongue and groove configuration. Design provides panel-to-panel interlock. The lead panel shall seal against the adjacent wall without the need for wall mounted jambs.
2. Horizontal Top Seals: Continuous contact vinyl.
3. Horizontal bottom seals: Manual, retractable seal, providing up to 2 inches nominal operating clearance, and exert downward force when extended.

D. Hinges: Full leaf butt hinges, attached directly to panel frame. Welded hinge anchor plates withing panel shall further support hinge mounting to frame. Hinges mounted into panel edge or vertical astragal is not acceptable.

E. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.

F. Jamb: Nominal fixed jamb, covered to match panels.

G. Closure: Expandable panel closure.

2.3 SUSPENSION SYSTEMS

A. Suspension Tracks: #17 Track System, bracket mounted, 11 gauge roll-formed steel, with drop soffit trim.

1. Track shall be capable of either direct mounting to a wood header or shall be supported by adjustable steel hanger brackets connected to structural support by pairs of 0.38 inch diameter threaded rods. Brackets shall support the load bearing surface of the track.

B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation. Each panel (except hinged panels) shall have one all-steel trolley with steel tired ball-bearing wheels.

- C. Steel Finish: Factory-applied, corrosion-resistant, protective coating, unless otherwise indicated.

2.4 ACCESSORIES

- A. Pass Doors: Provide pass doors as indicated on Drawings or as required by Interior Designer. Fabricated to comply with recommendations of ANSI A117.1. and the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)." Swinging door built into and matching panel materials, construction, acoustical qualities, finish and thickness, complete with frames and operating hardware. Hinges finished to match other exposed hardware.
 - 1. Single Pass Door: 36 by 80 inches, with the following:
 - a. Door Seals: Sweep floor seals.
 - b. Panic hardware.
 - c. Concealed door closer.
 - d. Lock: Key-operated lock cylinder, keyed to master key system, operable from both sides of door. Include two keys per lock.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with ASTM E 557, operable panel partition manufacturer's written installation instructions, Drawings, and approved Shop Drawings.
- B. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed.
- C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.

3.3 ADJUSTING

- A. Adjust operable panel partitions to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.
- B. Pass Doors: Adjust to operate smoothly and easily, without binding or warping. Check and readjust operating hardware. Confirm that latches and locks engage accurately and securely without forcing or binding.

3.4 CLEANING AND PROTECTION

- A. Clean soiled surfaces and facing materials on completing installation of operable panel partitions, to remove dust, adhesives, and other foreign materials according to manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure operable panel partitions are without damage or deterioration at time of Substantial Completion.
- C. Replace panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.
 - 1. Test and adjust seals, hardware, carriers, tracks, pass doors, pocket doors, and other operable components. Replace damaged or malfunctioning operable components.
 - 2. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
 - 3. Review data in maintenance manuals.
 - 4. Schedule training with Owner with at least seven days' advance notice.

END OF SECTION

SECTION 10800
TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Toilet accessories.

1.2 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with the following:
1. ANSI A117.1 "Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People."
 2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA)."
 3. ADA Accessibility Guidelines (ADAAG).

1.3 SUBMITTALS

- A. Product Data: For each product indicated showing sizes, construction and mounting techniques.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use room and product designations indicated on Drawings.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight.
- B. Storage: Adequately protect against damage while stored at site.
- C. Handling: Comply with Manufacturer's instructions.

1.5 WARRANTY

- A. Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace mirrors that develop visible silver spoilage defects within 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Specialties, Inc.
 2. Bobrick Washroom Equipment, Inc.
 3. Bradley Corporation.
 4. General Accessory Manufacturing Co. (GAMCO).

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, No. 4 finish (satin), 0.0312-inch minimum nominal thickness, unless otherwise indicated.
- B. Steel Sheet: ASTM A 366, 0.0359-inch minimum nominal thickness.
- C. Galvanized Steel Sheet: ASTM A 653, G60.
- D. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.
- E. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.
- G. Backing Plates: 16 gage cold-rolled steel for mounting grab bars in stud partitions.
- H. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of 6 keys to Owner's representative.

2.3 TOILET ACCESSORIES

- A. Schedule of Accessories: As indicated on Drawings.

2.4 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination with other Work: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

2.5 INSTALLATION

- A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer and in compliance with ANSI A117.1 as applicable. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.
- B. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

2.6 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 11450
RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Residential appliances.
- B. Related Sections:
 - 1. Division 15 Sections: Plumbing connections.
 - 2. Division 16 Sections: Electrical services and connections.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for each product indicated.
- B. Appliance Schedule: Use same room designations shown on Drawings.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. UL and NEMA Compliance: Provide electrical components required as part of residential appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
- C. AGA and ANSI Standards: Provide gas-burning appliances that carry the design certification seal of AGA and that comply with ANSI Z21-Series standards.
- D. AHAM Standards:
 - 1. Refrigerators and Freezers: Total volume and shelf area ratings certified according to ANSI/AHAM HRF-1.
- E. Energy Ratings: Provide residential appliances that carry labels indicating energy-cost analysis (estimated annual operating costs) and efficiency information as required by the Federal Trade Commission.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver appliances only after utility rough-in is complete and construction in spaces to receive appliances is substantially complete and ready for installation.
- B. Storage: Adequately protect against damage while stored at the site.

1.5 WARRANTY

- A. Warranty: Manufacturer's standard warranty in which manufacturer agrees to repair or replace appliance that fails in materials and workmanship within specified warranty period.
 - 1. Microwave Oven: 10 -year limited warranty for in-home service on defects in magnetron tube.
 - 2. Refrigerator/Freezer: Five -year limited warranty on sealed refrigeration system.

PART 2 - PRODUCTS

2.1 RESIDENTIAL APPLIANCES

- A. Appliances: As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

- A. Built-in Appliances: Securely anchor to supporting cabinetry or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- B. Freestanding Appliances: Place in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

3.3 FIELD QUALITY CONTROL

- A. Tests: Test each item for proper operation. Check and adjust oven thermostats for correct temperature.

3.4 CLEANING

- A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition

END OF SECTION

SECTION 11451

CEILING FANS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Ceiling fans as indicated on Drawings and specified herein.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, design data and installation instructions.
- B. Shop Drawings: Submit drawings showing layout, dimensions and construction details.
- C. Contract Closeout Submittals: Submit Operating and Maintenance instructions.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Ceiling Fans: Suitable for outdoor use, minimum of 4 blades, integrated light kit, style and finish as selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
- B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

- A. Install ceiling fans at location indicated in strict accordance with manufacturer's printed instructions and approved shop drawings.
- B. Align work plumb, level and flush with adjacent surfaces.
- C. Rigidly anchor to substrate.

END OF SECTION