

TECHNICAL SPECIFICATIONS

January 30, 2026

Permit / Construction

**ABEL ARENA
NEW ALUMNI LOFT**

FOR

**LAKE SUPERIOR STATE
UNIVERSITY**

PREPARED BY



Sidock Group, Inc.

ENGINEERS • ARCHITECTS • CONSULTANTS • PROJECT MANAGERS

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PROJECT NO. 525066.F

**SECTION 00 0110
TABLE OF CONTENTS**

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 0110 - Table of Contents

00 0115 – List of Drawings

SPECIFICATIONS

DIVISION 01 - GENERAL REQUIREMENTS

01 0000 - General Requirements

01 1000 - Summary

01 2000 - Price and Payment Procedures

01 2300 – Alternates

01 2500 - Substitution Procedures

01 3000 - Administrative Requirements

01 3216 - Construction Progress Schedule

01 4000 - Quality Requirements

01 4100 - Regulatory Requirements

01 5000 – Temporary Facilities and Controls

01 6000 - Product Requirements

01 7000 - Execution and Closeout Requirements

01 7800 - Closeout Submittals

DIVISION 02 – EXISTING CONDITIONS

02 4119 – Selective Demolition

DIVISION 03 – CONCRETE

03 0516 – Underslab Vapor Retarder

03 1000 – Concrete Forming and Accessories

03 2000 – Concrete Reinforcing

03 3000 – Cast-in-Place Concrete

DIVISION 05 – METALS

05 1200 - Structural Steel Framing

05 2100 – Steel Joist Framing

05 3100 – Steel Decking

05 4000 – Cold-Formed Metal Framing

05 5000 - Metal Fabrications

DIVISION 06 – WOOD, PLASTICS AND COMPOSITES

06 1000 – Rough Carpentry

06 2000 – Finish Carpentry

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 2100 – Thermal Insulation

07 9200 – Joint Sealants

DIVISION 08 - OPENINGS

08 1113 – Hollow Metal Doors and Frames

08 4113 – Aluminum Framed Entrances & Storefronts

08 7100 - Door Hardware

08 8000 - Glazing

DIVISION 09 - FINISHES

09 2116 - Gypsum Board Assemblies

09 5100 – Acoustical Ceilings

09 6513 - Resilient Wall Base

09 6519 – Resilient Tile Flooring

09 9000 - Painting

DIVISION 10 - SPECIALTIES

10 2800 - Toilet Room Accessories

DIVISION 12 - FURNISHINGS

12 2400 - Window Shades

12 3200 – Plastic Laminate Casework

12 3600 – Countertops, Window Stools, and Wall Caps

END OF SECTION

**SECTION 00 0115
LIST OF DRAWING SHEETS**

COVER SHEETS

CS-000	COVER SHEET
CS-001	CODE DATA
CS-002	ABBREVIATIONS, DRAWING LEGEND

STRUCTURAL

S-001	STRUCTURAL NOTES
S-101	FLOOR PLAN AND ROOF FRAMING
S-201	SECTIONS

ARCHITECTURAL

AD-100	DEMOLITION FLOOR PLAN
A-101	FLOOR PLAN
A-201	ELEVATIONS
A-301	SECTIONS, INTERIOR ELEVATIONS, AND DETAILS
A-701	SCHEDULES AND DETAILS
A-721	WALL TYPES AND FIRE RATED ASSEMBLIES
A-801	REFLECTED CEILING PLAN

ELECTRICAL

E-100	ELECTRICAL SPECIFICATIONS AND SYMBOL SCHEDULE
E-101	ELECTRICAL POWER AND LIGHTING PLAN

MECHINICAL

M-100	MECHANICAL SYMBOLS, NOTES, & ABBREVIATIONS
M-101	MECHANICAL AND PLUMBING SPECIFICATIONS
M-400	LEVEL 2 FLOOR PLAN- HVAC NEW
M-900	HVAC SCHEDULES AND DETAILS

PLUMBING

P-100 PLUMBING SYMBOLS, NOTES & ABBREVIATIONS
P-400 BELOW LEVEL 2 FLOOR PLAN - PLUMBING NEW
P-401 LEVEL 2 FLOOR PLAN - PLUMBING NEW

END OF SECTION

**SECTION 01 0000
GENERAL REQUIREMENTS**

PART 1 - GENERAL

1.01 GENERAL:

- A. The General Conditions, AIA A201-2017 "Standard form of General Conditions of Contract between Owner and Contractor", Supplementary General Conditions and these General Requirements shall be considered as an inclusive part of each division of these specifications. All subcontractors as well as the General Contractor shall be governed by all applicable sections of these documents with reference to their respective areas of work. It shall be the responsibility of the General Contractor to apprise all subcontractors and suppliers of these requirements.
- B. Where the specifications refer to products of one or more manufacturers, such references designate the type, quality, size, grade, style, etc. of materials or equipment to be furnished and are not intended to restrict competitive bidding. Written approval of the Architect must be secured for use of any alternate material or product.
- C. The drawings and these specifications are intended to be complementary, what is called for by either shall be as binding as if called for by both. Any discrepancies found between the drawings and the specifications shall be brought to the attention of the Architect for the interpretation of the intent of the contract documents.
- D. It shall be the responsibility of the General Contractor and all subcontractors to have examined and reviewed the existing building, the site and the complete set of working drawings and specifications and to provide all labor and material for their respective area of work for a complete and finished installation in compliance with the intent of the drawings and specifications whether indicated or not, all work shall be in compliance with all codes and ordinances that are applicable to the project. Costs for permits, bonds, fees, etc., shall be the responsibility of each subcontractor.
 - 1. Submittal of proposal implies that the Bidder is fully conversant with all requirements of all said Divisions and Documents. No claims for additional compensation will be entertained or paid to any Contractor or Subcontractor on account of his failure to be fully informed of all requirements of all documents.
- E. Subcontractors shall cooperate with each other and with the General Contractor to provide materials and labor that are necessary in each other's work at the proper times so that the construction schedule is not affected. These interfacing shall be the responsibility of the subcontractors whose work is affected as such.
- F. Every subcontractor is to remove his own debris from jobsite and to keep areas of this work in broom swept condition as directed by the job superintendent.
- G. In no instance shall any contractor or subcontractor substitute any material or process stipulated or scheduled in these Specifications or the Drawings without prior written approval of Architect. In preparation of Bid Proposals, should any subcontractor desire to change or substitute any material or construction process utilized in Contract Drawings and Specifications, he may request same upon written notification to Architect and by identifying in his Bid Proposal any such proposed changes, alterations or omissions.
- H. Where the specifications refer to products of one or more manufacturers, such references designate the type, quality, size, grade, style, etc., of materials or equipment to be furnished and are not intended to restrict competitive bidding. Written approval of the Architect must be secured for use of any alternate material or product.
- I. The General Contractor shall keep a competent superintendent on the jobsite at all times during the progress of the work.
- J. Shop drawings - shall be submitted for each separate portion of the work. Shop drawings shall be submitted to the General Contractor who shall thoroughly review, stamp and sign approved each submittal prior to submittal to the Architect. Data submitted shall show proposed

equipment only and shall not be catalogs showing a manufacturer's complete line. A minimum of three samples shall be submitted unless additional samples are requested. All shop drawings and samples shall be identified with the job name and shall be accompanied by a letter of transmittal containing a complete list of the submitted material.

1.02 LAYOUT OF WORK:

- A. The General Contractor shall locate and provide all general reference points and take ordinary precautions to prevent their destruction. Each subcontractor shall be responsible for laying out his own work and shall be responsible for all lines, elevations measurements, grading and other as may be required by his work. He shall be held responsible for verifying all figures and details shown on the drawings, which relate to his work, prior to laying out the work. He will be held responsible for any error resulting from his failure to take such precautions.
- B. The General Contractor shall be responsible for establishing field benchmarks for the purpose of establishing required elevations. The stakes shall be sufficiently far enough away from the work so as not to be disturbed.

1.03 FIELD DRAWINGS AND RECORD DRAWINGS:

- A. A complete set of working drawings and specifications shall be maintained by the General Contractor on the site and shall be updated regularly. All changes and/or modifications made in the field must be recorded by the General Contractor and each subcontractor on their own field set as soon as the change is made, and immediately thereafter, recorded on the General Contractor's field set.
- B. This shall comprise an accurate set of marked-up drawings and specifications of the project, insofar as the actual construction or installation differs from the Contract Drawings. These "record" drawings and specifications are required at the time of Substantial Completion, and shall be turned over to the Architect in electronic format and hard copy at that time for the purpose of recording changes on the original working drawings.

1.04 SAFE PREMISES:

- A. It shall be the responsibility of each subcontractor to maintain all areas adjacent to the construction site in a manner not to hinder or endanger normal traffic flow, or endanger or damage adjacent property.
- B. Streets and sidewalks adjacent to the site shall be kept clean and open for pedestrian and vehicular traffic. Warning lights, guards and barricades shall be utilized and maintained as required to ensure these conditions by the subcontractor whose work is partially or totally in the above stated area. General Contractor shall provide for all temporary walk areas required for access to the building area and as necessary to carry out the work.
- C. The responsible subcontractor is to provide scaffolding necessary for all of his work. All scaffolding must be built in accordance with the requirements of federal, state and local regulations.
- D. Temporary stairs, ladders and ramps shall be provided by the subcontractor for his work in order to safely enable access to all parts of the work by the Architect, the Owner and any authorized inspecting personnel. All such equipment shall meet all federal, state and local safety requirements.

1.05 VERMIN EXTERMINATION:

- A. The General Contractor shall be responsible to contract for the extermination of all insects, rodents and other pests within the contract area of the building prior to turning such building over to the Owner.

1.06 CONTRACTOR AND SUBCONTRACTOR INSURANCE:

- A. The Contractor and each subcontractor are required to purchase and maintain the following types of insurance:
 - 1. Workman's Compensation
 - 2. Public Liability Insurance with the following minimum coverage.
 - a. General Liability-\$1,000,000 per occurrence.
 - b. Bodily Injury-Minimum of \$1,000,000 per occurrence.

- c. Property Damage-Minimum of \$1,000,000.
 - d. Include Contractual Liability coverage with same limits.
 - e. The Owner of the property shall be named as an additional insured.
3. Appropriate insurance certificates must be submitted prior to any payment requests.

1.07 GUARANTEE PERIOD:

- A. The General Contractor shall and hereby does guarantee and warrant that all work for this development, under this Contract, shall be free from defects or faulty labor and/or materials for a period of one (1) year from date of Substantial Completion of the project, except when longer periods are herein specified.

1.08 USE OF PREMISES, BARRICADES AND PROTECTIONS:

- A. Contractors and subcontractors shall be subject to such rules and regulations for the conduct of the work as the Owner or General Contractor may establish. All employees shall be properly and completely clothed while working. Bare torsos, legs and feet will not be allowed. Possession or consumption of alcoholic beverages or drugs, or other noxious behavior on the site is strictly prohibited. Violators shall be promptly removed from the site. Profane or abusive language will not be tolerated or permitted on the site.
- B. Before starting the work, each Contractor shall ascertain from the General Contractor what entrances, routes or roadways shall be used for access to the work, and use only those designated for movement of personnel, materials and vehicles to and from the work. Close coordination will be required of each Contractor with the Owner, General Contractor, other Contractors, and others having an interest in the Project to assure that work on the site, access to and from the site and the general conduct of operations is maintained in a safe and efficient manner, and that disruption and inconvenience to existing streets and property is minimized. Each Contractor is responsible to review the site and be familiar with all existing conditions within and around the Owner's property including local conditions and requirements.
- C. Contractors shall maintain free access to all buildings and areas of the site for designated vehicles, service vehicles and firefighting equipment and at no time shall block off or close roadways or fire lanes without providing auxiliary roadways and means of entrance acceptable to the Owner. Fire hydrants must remain accessible at all times. Contractors shall give the Owner and the local fire department at least forty-eight (48) hours' notice of any such changes of routes.
- D. Each Contractor and subcontractor shall provide and maintain in good repair barricades, overhead protection, guard rails, handrails etc., as required by law an OSHA requirement(s) or necessary for the protection of the public and personnel engaged in the work from hazards incidental to this contract. Do everything necessary to protect Owner's employees, and public and workmen from injury or damage to vehicles or other property.
- E. Contractors will not be allowed to use any Owner tools or equipment during the course of this project.
- F. Each Contractor shall confine his work to normal working hours as defined by the General Contractor. The Contractor may prosecute the work during the entire twenty-four (24) hours of any day of the week with the approval of the General Contractor, providing that he so conducts his operations as to not create a public nuisance or disturb the peace, and provided such operations are conducted so as to comply with all applicable laws, ordinances and regulations.
- G. Whenever a Contractor intends to depart from normal work hours, he shall notify the General Contractor in writing at least forty-eight (48) hours in advance. Failure of the Contractor to give such timely notice may be cause for the General Contractor to require the removal or uncovering of the work performed during such time without the knowledge of the General Contractor. Special arrangements can be made for emergency work or shutdowns as may be required.
- H. Each Contractor and subcontractor shall be responsible for all damage to the project including the existing buildings and grounds due to his operations under this contract. Repair or replacement of damaged items shall be to the satisfaction of the Owner.

- I. Each Contractor shall at all times maintain a clean and safe passageway for the Owner's operation and personnel in existing areas and maintain clearances adjacent to and in connection with the work performed.
- J. All Contractors shall limit their use of the premises for work and for storage, to allow for:
 - 1. Work by other Contractors.
 - 2. Owner occupancy.
 - 3. Public use and safety.

PART 2 – SPECIAL CONDITIONS

2.01 SUBSTITUTIONS:

- A. Substitutions in the specified work shall be covered by the following statement in the Special Conditions: "Material and Workmanship." Unless otherwise specifically provided in this contract, reference to any equipment, material, article, or patented process, by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at their option, use any equipment, material, article or process, which, in the judgment of the Architect, is equal to that named. The Contractor shall furnish to the Architect for approval the name of the manufacturer, the model number, and other identifying data and information respecting the performance, capacity, nature, and rating of the machinery and mechanical and other equipment, which the Contractor contemplates incorporating in the work. When required by its contract or when called for by the Architect, the Contractor shall furnish the Architect for approval, full information concerning the material or articles, which the contractor contemplates incorporating into the work. When directed, samples shall be submitted for approval at the Contractor expense, with all shipping charges prepaid. Machinery, equipment, material, and articles installed or used without required approval shall be at the risk of subsequent rejection.

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 1000
SUMMARY**

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Lake Superior State University: Norris Center Men's Locker Room Renovation
- B. Owner's Name: Lake Superior State University
650 W. Easterday Ave. Sault Saint Marie, Michigan 49783
- C. Architect's Name: Sidock Group, Inc..
757 S. Wisconsin
Gaylord, Michigan 48735
(989) 705-8400
- D. Contractor's Name:
- E. The Project consists of the renovation the current Norris Centers Men's Locker Room and adding a new private shower space and steam room for the men's basketball team.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract.
 - 1. AIA A101 - 2017, Owner-Contractor Agreement
 - 2. AIA A201 -2017, General Conditions of the Contract for Construction

1.03 CONTRACTOR USE OF SITE AND PREMISES

- A. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.

1.04 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Section 01 0000 – General Requirements
- C. Section 01 2000 - Price and Payment Procedures.
- D. Section 01 2300 - Alternates.
- E. Section 01 2500 – Substitution Procedures
- F. Section 01 3000 - Administrative Requirements.
- G. Section 01 3216 - Construction Progress Schedule.
- H. Section 01 4000 - Quality Requirements.
- I. Section 01 4100 – Regulatory Requirements
- J. Section 01 6000 - Product Requirements.
- K. Section 01 7000 - Execution and Closeout Requirements.
- L. Section 01 7800 - Closeout Submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

LAKE SUPERIOR STATE UNI.
ABEL ARENA ALUMNI LOFT
SGI PROJECT 525066.F

01 1000 - 1

SUMMARY

**SECTION 01 2000
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Change procedures.

1.03 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Execute certification by signature of authorized officer.
- E. Submit one electronic and one hard-copies of each Application for Payment.
- F. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01 3000.
 - 2. Construction progress schedule, revised and current as specified in Section 01 3000.
 - 3. Current construction photographs specified in Section 01 3000.
 - 4. Partial release of liens from major subcontractors and vendors.
 - 5. Affidavits attesting to off-site stored products.
- G. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within five working days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation.
Document any requested substitutions in accordance with Section 01 6000.

- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 - 4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- F. Substantiation of Costs: Provide full information required for evaluation.
 - 1. Provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- J. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 2300
ALTERNATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for pricing Alternates.

1.02 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 2500
SUBSTITUTION PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
- D. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

3.03 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.04 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Progress photographs.
- F. Submittals for review, information, and project closeout.
- G. Number of copies of submittals.
- H. Requests for Interpretation (RFI) procedures.
- I. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: General product requirements.
- B. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 REFERENCE STANDARDS

- A. AIA G716 - Request for Information.

1.04 PROJECT COORDINATOR

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for vehicle access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Schedule meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Submission of initial Submittal schedule.
 - 6. Designation of personnel representing the parties to Contract and Architect.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at intervals determined by the agreement.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Maintenance of progress schedule.
 - 9. Corrective measures to regain projected schedules.
 - 10. Planned progress during succeeding work period.
 - 11. Coordination of projected progress.
 - 12. Maintenance of quality and work standards.
 - 13. Effect of proposed changes on progress schedule and coordination.
 - 14. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.

- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

3.04 PROGRESS PHOTOGRAPHS

- A. Submit new photographs at least once a month, within 3 days after being taken.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
 - 1. Structural framing in progress and upon completion.
 - 2. Enclosure of building, upon completion.
 - 3. Final completion, minimum of ten (10) photos.
- E. Views:
 - 1. Provide factual presentation.
 - 2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

3.05 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 - 2. Combine RFI and its attachments into a single electronic file. PDF format is preferred. C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 - 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 - 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
 - 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response.

- a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect's, and Contractor's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date, and requested reply date.
 - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.06 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 - 1. Coordinate with Contractor's construction schedule and schedule of values.

3.07 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.

- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.08 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.09 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.10 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.11 SUBMITTAL PROCEDURES

- A. General Requirements:
 - 1. Use a separate transmittal for each item.
 - 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 - 3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 - 4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 - 5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 - 6. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Send submittals in electronic format via email to Architect.

7. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
 8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 9. Provide space for Contractor and Architect review stamps.
 10. When revised for resubmission, identify all changes made since previous submission.
 11. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 12. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Submit concurrently with related shop drawing submittal.
 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 2. Do not reproduce Contract Documents to create shop drawings.
 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.12 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

END OF SECTION

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Construction progress schedule, bar chart type.

1.02 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual.

1.03 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- D. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.04 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.

- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Control of installation.
- F. Tolerances.
- G. Manufacturers' field services.
- H. Defect Assessment.

1.02 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants.
- B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing.
- G. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components.
- H. IAS AC89 - Accreditation Criteria for Testing Laboratories.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
 - 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit report in duplicate within 30 days of observation to Architect for information.
 - 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- G. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
 - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Contractor's Quality Control (CQC) Plan:
 - 1. Prior to start of work, submit a comprehensive plan describing how contract deliverables will be produced. Tailor CQC plan to specific requirements of the project. Include the following information:
 - a. Management Structure: Identify personnel responsible for quality. Include a chart showing lines of authority. Include qualifications (in resume form), duties, responsibilities of each person assigned to CQC function.
 - b. Owner will not make a separate payment for providing and maintaining a Quality Control Plan. Include associated costs in Bid price.
 - c. Acceptance of the plan is required prior to start of construction activities not including mobilization work. Owner's acceptance of the plan will be conditional and predicated on continuing satisfactory adherence to the plan. Owner reserves the right to require Contractor to make changes to the plan and operations, including removal of personnel, as necessary, to obtain specified quality of work results.
- D. Quality-Control Personnel Qualifications. Engage a person with requisite training and experience to implement and manage quality assurance (QA) and quality control (QC) for the project.

1.05 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with

requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor shall employ and pay for services of an independent testing agency to perform specified testing and inspection.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
 - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
 - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
 - 3. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
 - 4. Laboratory: Authorized to operate in the State in which the Project is located.
 - 5. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
 - 6. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION 3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

- A. Testing Agency Duties:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 6. Perform additional tests and inspections required by Architect.
 - 7. Attend preconstruction meetings and progress meetings.
 - 8. Submit reports of all tests/inspections specified.
 - B. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
 - C. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
 - E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.
 - F. Provide patching and restoration services where test samples have been removed, complying with individual technical sections
 - G. Except for specialized laboratory sampling equipment, and except as otherwise indicated, supply and operate tools and construction equipment needed to obtain test samples from the work, including cutting devices for sawing, drilling, flame cutting, coring and similar operations. Assist agencies in labeling and packaging of test samples removed from the work.
- Coordination with Contractor's Independent Agencies: Except for required independent agency activities of inspection, measuring, testing, analyzing, reporting and similar activities, the

assignment of labor, equipment, cutting, patching and similar necessary activities associated therewith are Contractor's option recognizing that entire activity is Contractor's responsibility.

- H. Coordination with Contractor's Independent Agencies: Except for required independent agency activities of inspection, measuring, testing, analyzing, reporting and similar activities, the assignment of labor, equipment, cutting, coring and similar operations. Assist agencies in labeling and packaging of test samples removed from the work.

3.04 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Owner, it is not practical to remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION

**SECTION 01 4100
REGULATORY REQUIREMENTS**

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

- A. Regulatory requirements applicable to this project are the following:
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- C. 29 CFR 1910 - Occupational Safety and Health Standards.
- D. State of Michigan amendments to some or all of the following.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities.
- F. ICC (IFC) - International Fire Code.
- G. NFPA 1 - Fire Code.
- H. NFPA 101 - Life Safety Code.
- I. ICC (IBC) - International Building Code.
- J. ICC (IPC) - International Plumbing Code.
- K. ICC (IMC) - International Mechanical Code.
- L. ICC (IFGC) - International Fuel Gas Code.
- M. ICC (IPSDC) - International Private Sewage Disposal Code.
- N. NFPA 70 - National Electrical Code.
- O. ICC (IECC) - International Energy Conservation Code.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

1. TEMPORARY UTILITIES

- A. Trade Contractors shall not use temporary light and power system for electric heating, welders or for tools requiring larger than minimum loads specified.
- B. If Work of separate Trade Contractors or Subcontractors requires three phase power or voltage exceeding 120 Volts for tools or equipment, that Trade Contractor or subcontractor with additional power requirements shall provide required temporary distribution system.
- C. Each separate Trade Contractor and Subcontractor shall make arrangements for electrical service, lighting and power for their field office, storage sheds and other temporary buildings.
- D. Electrical Trade Contractor shall remove temporary light and power system when no longer required. Salvaged materials shall become property of the Electrical Trade Contractor.

1.2. TEMPORARY TELEPHONES

- A. Temporary telephones shall be arranged and paid for by each individual Trade Contractor per their requirements.

1.3. TEMPORARY DATA CONNECTIONS

- A. Data connections if required by Trade contractor shall be arranged for and paid for by each individual Trade Contractor per their requirements.

1.4. TEMPORARY WATER

- A. Temporary water will be available from an on-site fire hydrant upon completion of underground utilities. Each Trade Contractor shall transport the water to their area of Work as required.

1.5. TEMPORARY TOILETS

- A. The Construction Manager will provide temporary toilets.

1.6. FIRE SAFETY

- A. The 06A - General Trades Contractor shall provide a minimum of 20 pound U.L. rated multi-purpose (Type A, B, C) fire extinguishers on stands spaced throughout the building at all times spaced such that the travel distance to a fire extinguisher shall not exceed 100 feet. Fire extinguisher stand shall be "Fire-Safety Mate" or equal as manufactured by the Gorla Corporation, (telephone 888.464.6742).

1.7. TEMPORARY CONTROLS

A. CONSTRUCTION CLEANING

1. On-going Clean-up

- a. Project clean-up and disposal of debris is the responsibility of each Trade Contractor for their own material and shall be performed on a daily basis.

- b. Fridays of each week are designated as total project clean-up day. Trade Contractors shall be responsible to provide a labor force to thoroughly clean all areas where it has performed Work or otherwise created a need for clean-up. Friday clean-up shall include broom clean condition (sweeping compounds shall be silica free)
- c. Trade Contractor shall furnish labor for clean-up of unidentifiable debris including broom clean as directed by the Construction Manager in proportion to its Workforce.
- d. In the event that the Trade Contractor fails to clean up and dispose of all debris promptly after written direction to comply, the Construction Manager will clean-up the debris and Trade Contractor shall be responsible for all associated costs.
- e. The Construction Manager will provide dumpsters. These dumpsters are NOT to be used for disposal of dirt, sod, asphalt, & concrete. Disposal of these items are to be done at the Trade Contractors expense.
- f. Trade Contractors' daily cleanup of the project site is to be completed at the end of each day. If cleanup is not performed, then an additional 10% percent of the Trade Contractors monthly payment will be withheld until the work area/jobsite is deemed acceptable.

2. **Work in Place Progress Cleaning**

- a. Each Trade Contractor shall be responsible for cleaning of all material and equipment installed upon completion of installation of same.
- b. Work in place progress cleaning by each Trade Contractor shall include but not limited to the following:
 - i. Remove labels which are not required to be permanent.
 - ii. Clean transparent materials, including mirrors and window/door glass to a polished condition.
 - iii. All interior and exterior building material and equipment finished surfaces and components shall be cleaned to be free of dirt, dust, oils, film, and other foreign material.
 - iv. Clean debris and dust from limited-access spaces including roofs, plenums, ducts, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
 - v. Each Trade Contractor, after completing its Work in any space, shall thoroughly clean any and all debris, dirt and dust caused by its Work or presence in a space. Such clean-up shall include but not be limited to:
 - 1. Vacuum or washing of floor, wall, ceiling and other surfaces.
 - 2. Restoring interior and exterior areas to condition that existed prior to occupying the space or commencement of the Work.
 - vi. Trade Contractors' daily cleanup of the project site is to be completed at the end of each day. If cleanup is not performed, then an additional 10% percent of the Trade Contractors monthly payment will be withheld until the work area/jobsite is deemed acceptable.

3. **Debris disposal**

- a. All debris shall be legally disposed of off-site. Salvage opportunities, including debris sorting, to maximize recycling efforts is required and will need to be reported to the Construction Company on a monthly basis, if dumpsters are not provided by the Construction Company. Percentage of waste diverted from landfills must also be reported.
- b. Debris shall not be buried, covered up or left in walls or above ceilings.
- c. Burning of debris will not be permitted on the project site.
- d. The Construction Manager will provide dumpsters. These dumpsters are NOT to be used for disposal of dirt, sod, asphalt, & concrete. Disposal of these items are to be done at the Trade Contractors expense.

4. **Street Cleaning**

- a. Trade Contractors shall be responsible for keeping all paved surfaces and public streets in the vicinity of the project clean of dirt and other debris that is a direct result of his operations.
- b. Cleaning shall consist of cleaning the streets with a pick-up type sweeper in such a manner that the pavement and gutters are maintained broom clean for the duration of the Contract.
- c. In the event that the Trade Contractor fails after written direction to promptly comply with street cleaning requirements, the Construction Manager shall perform the Work and charge the Trade Contractor all associated costs.

1.8. **MATERIAL AND EQUIPMENT HANDLING**

- A. Material and equipment shall be handled and stored utilizing means and methods to avoid damage, soiling, exposure to adverse weather, etc.
- B. Store weather sensitive products in weather-tight enclosures; maintain within humidity ranges required by manufacturer.
- C. Products stored on-site shall be supported as not to be in contact with ground and to avoid soiling.
- D. In the event that products become soiled, exposed to adverse weather or damaged, the Trade Contractor shall clean, repair or replace, if necessary, the product to achieve new condition acceptable to the Owner and Architect.
- E. Coordinate material and equipment deliveries to meet requirements of the construction schedule.
- F. Coordinate all delivery dates and storage spaces with the Construction Manager.
- G. Trade Contractor shall be responsible for receipt, unloading and handling of products under its Contract. The Construction Manager or others will not receive deliveries for Trade Contractors unless noted otherwise in the Documents.

1.9. **PROTECTION OF INSTALLED WORK**

- A. Protect installed Work and provide special protection where specified in Contract Documents.
- B. Trade Contractors required to Work on roof surfaces shall be responsible to take all precautions necessary to avoid puncture to roofing materials and shall place not less than the equivalent of ½ inch plywood to protect Work surface.

1.10. **SECURITY**

- A. Trade Contractors shall provide all means of security and facilities as necessary to protect tools and equipment from theft or vandalism. Trade Contractor's shall be responsible for insurance and cost of replacement of all tools and equipment.

1.11. **OFFICE/STORAGE FACILITIES**

- A. Trade Contractor shall not place storage and/or office facilities on-site without prior approval of the Construction Manager.
- B. Storage and office facilities shall be in good condition and appearance as determined by the Construction Company. The Construction Company reserves the right to demand removal of facilities that do not meet this requirement.
- C. Field offices and storage facilities shall remain portable and are subject to relocation.
- D. Cost of set-up and any relocation of field offices and storage facilities shall be the responsibility of the Trade Contractor.
- E. Electric heat or air-conditioning will not be allowed for field offices or storage facilities unless the Trade Contractor arranges for its own metered electrical service.

1.12. **REMOVAL OF UTILITIES, FACILITIES AND CONTROLS**

- A. Remove all temporary above grade or buried utilities, equipment, facilities and materials when directed by the Construction Manager.
- B. Clean and repair damage caused by installation or use of temporary Work.

END OF SECTION

**SECTION 01 6000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.

1.02 RELATED REQUIREMENTS

- A. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 01 4000 - Quality Requirements, for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Containing lead, cadmium, or asbestos.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid

loss of factory calibration.

- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Cleaning and protection.
- C. Starting of systems and equipment.
- D. Demonstration and instruction of Owner personnel.
- E. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- F. General requirements for maintenance service.

1.02 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.04 QUALIFICATIONS

- A. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.05 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- C. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- D. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

- A. The Contractor shall locate and provide all general reference points and take ordinary precautions to prevent their destruction. Each subcontractor shall be responsible for laying out his own work and shall be responsible for all lines, elevations measurements, grading and other as may be required by his work. He shall be held responsible for verifying all figures and details shown on the drawings, which relate to his work, prior to laying out the work. He will be held responsible for any error resulting from this failure to take such precautions.
- B. The Contractor shall be responsible for establishing field benchmarks for the purpose of establishing required elevations. The stakes shall be sufficiently far enough away from the work so as not to be disturbed.
- C. Verify locations of survey control points prior to starting work.
- D. Promptly notify Architect of any discrepancies discovered.
- E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- H. Utilize recognized engineering survey practices.
- I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
- J. Periodically verify layouts by same means.
- K. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.06 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.07 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.08 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.
- B. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.09 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.10 FINAL CLEANING

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.11 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.12 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

**SECTION 01 7800
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED REQUIREMENTS

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

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Changes made by Addenda and modifications.
- F. Record Drawings: Legibly mark each item to record actual construction including:

1. Field changes of dimension and detail.
2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

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

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

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

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 3 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Operation and maintenance data.
 - c. Field quality control data.
 - d. Photocopies of warranties and bonds.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

I. GUARANTEE PERIOD:

1. The Contractor shall and hereby does guarantee and warrant that all work for this development, under this Contract, shall be free from defects or faulty labor and/or materials for a period of one (1) year from date of Substantial Completion of the project, except when longer periods are herein specified, which develop within any guarantee periods.

END OF SECTION

**SECTION 02 4119
SELECTIVE DEMOLITION**

GENERAL

RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Demolition and removal of existing walls, selected finishes and plumbing fixtures.
 2. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 FIELD CONDITIONS

Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work. Notify Architect immediately if any hazardous materials are found.

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

1.6 COORDINATION

Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify that utilities have been disconnected and capped before starting selective demolition operations.

PROTECTION

Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent rooms and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
- B. Remove temporary barricades and protections where hazards no longer exist.

3.3 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with other adjacent occupied and used facilities.

Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

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

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

DISPOSAL OF DEMOLISHED MATERIALS

Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

Burning: Do not burn demolished materials.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 03 0516
UNDERSLAB VAPOR RETARDER

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheet vapor retarder under concrete slabs on grade. May be noted as "vapor barrier" on drawings, meaning the same as this section.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3000 - Cast-in-Place Concrete

1.03 REFERENCE STANDARDS

- A. ASTM International:
 - 1. ASTM E1745-17 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
 - 2. ASTM E1643-18a Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- B. Technical Reference - American Concrete Institute (ACI):
 - 1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
 - 2. ACI 302.1R-15 Guide to Concrete Floor and Slab Construction.

A.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Quality control/assurance:
 - 1. Summary of test results per paragraph 9.3 of ASTM E1745.
 - 2. Manufacturer's samples and literature.
 - 3. Manufacturer's installation instructions for placement, seaming, penetration prevention and repair, and perimeter seal per ASTM E1643.
 - 4. All mandatory ASTM E1745 testing must be performed on a single production roll per ASTM E1745 Section 8.1.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Vapor retarder shall have all of the following qualities:
 - 1. Maintain permeance of less than 0.03 Perms [grains/(ft² · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
 - 2. Other performance criteria:
 - a. Strength: ASTM E1745 Class A.
 - b. Thickness: 10 mils minimum
 - 3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1

- A. Vapor retarder products:
 - 1. Basis of Design: Stego Wrap Class A Vapor Retarder by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com.
 - 2. W.R. Meadows; Perminator, www.wrmeadows.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 ACCESSORIES

- A. Seams:
 - 1. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
- B. Sealing Penetrations of Vapor Retarder:
 - 1. Stego Mastic by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
 - 2. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
- C. Perimeter/edge seal:
 - 1. Stego Crete Claw by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
 - 2. Stego Term Bar by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
 - 3. StegoTack Tape (double-sided sealant tape) by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
- D. Penetration Prevention:
 - 1. Beast Foot by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
 - 2. Beast Form Stake by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com
- E. Vapor Barrier-Safe Screed System
 - 1. Beast Screed by Stego Industries, LLC, (877) 464-7834 www.stegoindustries.com.
 - 2. Beast Hook by Stego Industries, LLC, (877) 464-7834 www.stegoindustries.com.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.
- B. Ensure that subsoil is approved by Architect or Geotechnical Engineer.
 - 1. Level and compact base material.

3.2 INSTALLATION

- A. Install vapor retarder in accordance ASTM E1643.
1. Unroll vapor retarder with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
 2. Extend vapor retarder to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the Architect or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor retarder. At the point of termination, seal vapor retarder to the foundation wall, grade beam or slab itself.

Seal vapor retarder to the entire slab perimeter using Stego Crete Claw, per manufacturer's instructions.

OR

- a. Seal vapor retarder to the entire perimeter wall or footing/grade beam with double sided StegoTack Tape, or both Stego Term Bar and StegoTack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.
3. Overlap joints 6 inches and seal with manufacturer's seam tape.
4. Apply seam tape/Crete Claw to a clean and dry vapor retarder.
5. Seal all penetrations (including pipes) per manufacturer's instructions.
6. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use Beast Form Stake and Beast Foot as a vapor barrier-safe forming system. Ensure Beast Foot's peel-and-stick adhesive base is fully adhered to the vapor barrier.
7. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
8. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor retarder.
9. Repair damaged areas with vapor retarder material of similar (or better) permeance, puncture and tensile.
10. For vapor barrier-safe concrete screeding applications, install Beast Screed (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

END OF SECTION

**SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ACI SP-66- ACI Design Manual
- B. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- C. ACI 301 - Specifications for Structural Concrete; 2020.
- D. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2019.
- E. ACI 347R - Guide to Formwork for Concrete; 2014, (Reapproved 2021)
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on void form materials and installation requirements.
- C. Shop Drawings: Indicate dimensions, materials, shoring, bracing, and arrangement of joints and ties.
- D. Samples: Submit two, 12 inch long samples of waterstops and construction joint devices.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.
- B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work. Contractor's choice of materials that will provide smooth, stain-free final appearance.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

- C. Earth Cuts: Upon approval of the Architect-Engineer, side forms for footings and foundation walls may be of earth provided the soil will stand without caving and the sides of the bank are made with a neat cut to the minimum dimensions indicated on the drawings.
- D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
- E. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318 and complying with tolerances of ACI 117.

2.02 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor in accordance with ACI 301 requirements.

2.03 REMOVABLE PREFABRICATED FORMS

- A. Manufacturers:
 - 1. Molded Fiber Glass Construction Products Co; www.mfgcp.com.
 - 2. S-Form; Aluminum Formwork Systems: www.s-form.us.
 - 3. SureVoid Products, Inc; www.surevoid.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Preformed Steel Forms: Minimum 16 gage, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- C. Preformed Aluminum Forms: ASTM B221 (ASTM B221M), 6061-T6 alloy, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- D. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- E. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.
- F. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 2 inches thick.
- G. Pan Type: Steel, of size and profile indicated.

2.04 FORMWORK ACCESSORIES

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface. Alternate: Cone snap type that will leave no metal within 1-1/2 inches (38 mm) of concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
 - 1. Composition: Colorless reactive, mineral oil-based, soy-based, or vegetable-oil based compound.
 - 2. Do not use materials containing diesel oil or petroleum-based compounds.
 - 3. VOC Content: In compliance with applicable local, State, and federal regulations.
 - 4. Products:
 - a. SpecChem, LLC; Bio Strip WB (water-based): www.specchemllc.com.
 - b. W. R. Meadows, Inc; Duogard: www.wrmeadows.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- C. Dowel Sleeves: Plastic sleeve and nailable plastic base for smooth, round, steel load-transfer dowels.
 - 1. Products:
 - a. BoMetals, Inc; www.bometals.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

- D. Flashing Reglets: Galvanized steel, at least 22 gage, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- F. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings. Notify Architect in writing if discrepancies occur.

3.02 EARTH FORMS

- A. At Contractor's option, upon approval of the Architect-Engineer, side forms for footings and foundation walls may be of earth provided the soil will stand without caving and the sides of the bank are made with a neat cut to the minimum dimensions indicated on the drawings. No top over pours are permitted.
- B. Make all necessary provisions to prevent cave-ins during placement of concrete.
- C. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members that are not indicated on drawings.
- F. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
- G. Coordinate this section with other sections of work that require attachment of components to formwork.
- H. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

- E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.
- F. 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.

3.06 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
 - 1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
 - 2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.
- B. Camber slabs and beams in accordance with ACI 301.

3.08 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
- C. Do not reuse wood formwork more than two times for concrete surfaces to be exposed to view. Do not patch formwork.

3.09 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

**SECTION 03 2000
CONCRETE REINFORCING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete; 2016.
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- C. ACI SP-66 - ACI Detailing Manual; 2004.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
- E. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement; 2019, with Editorial Revision.
- F. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2016.
- G. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2016.
- H. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement; 2016.
- I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- J. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2015.
- K. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2018.
- L. CRSI (DA4) - Manual of Standard Practice; 2009.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
 - 1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the State in which the Project is located.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301.
 - 1. Maintain one copy of each document on project site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Continuously Galvanized Reinforcing Steel:

1. AZZ, Inc; Galvabar; www.azz.com.
2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 1. Deformed billet-steel bars.
- B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.
 1. Unfinished.
- C. Reinforcing Steel: Deformed bars, ASTM A996/A996M Grade 40 (280), Type A.
 1. Galvanized in accordance with ASTM A767/A767M, Class I.
- D. Reinforcing Steel Mat: ASTM A704/A704M, using ASTM A615/A615M, Grade 40 (40,000 psi) steel bars or rods, unfinished.
- E. Stirrup Steel: ASTM A1064/A1064M steel wire, unfinished.
- F. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
 1. Form: Flat Sheets- 5' x 12'
 2. WWR Style: 6 x 6 – W1.4 x W1.4.
- G. Fiber Reinforcement:
 1. Application: All interior concrete slabs.
 2. Synthetic Macro-Fiber: polyolefin macro-fiber engineered and designed for use in concrete complying with ASTM C1116/1116M, Type III, 1 to 2-1/4 inch long.
 3. Refer Section 03 3000 Mix Design for quantity and rate of mix.
- H. Reinforcement Accessories:
 1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 3. Provide stainless steel, galvanized or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.03 RE-BAR SPLICING:

- A. Coupler Systems: Mechanical devices for splicing reinforcing bars; capable of developing full steel reinforcing design strength in tension and compression.
 1. Products:
 - a. Dayton Superior Corporation; www.daytonsuperior.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for connecting dowels; capable of developing full steel reinforcing design strength in tension and compression.
 1. Products:
 - a. Dayton Superior Corporation; www.daytonsuperior.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Taper Tie Hole Plug: Mechanical device for plugging tie holes; anchors optional flush or recessed grout.
 1. Products:
 - a. Dayton Superior Corporation; www.daytonsuperior.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Grout: Cementitious, non-metallic, non-shrink grout for use with manufacturer's grout sleeve reinforcing bar coupler system.
 1. Products:
 - a. Dayton Superior Corporation; www.daytonsuperior.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is permitted only with the specific approval of Architect. Perform welding in accordance with AWS D1.4/D1.4M.
 - 1. Galvanized Reinforcement: Clean surfaces, weld and re-protect welded joint in accordance with CRSI (DA4).
- C. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.
- D. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as follows:
 - 1. Beams: 1 1/2 inch
 - 2. Supported Slabs and Joists: 3/4 inch.
 - 3. Column Ties: 1 1/2 inch.
 - 4. Walls (exposed to weather or backfill): 2 inch.
 - 5. Footings and Concrete Formed Against Earth: 3 inch.
 - 6. Slabs on Fill: 1 1/2 inch.
- E. Comply with applicable code for concrete cover over reinforcement.
- F. Bond and ground all reinforcement to requirements of Section 26 0526.

3.02 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

3.03 SCHEDULES

- A. Reinforcement For Superstructure Framing Members: Deformed bars, unfinished.
- B. Reinforcement For Foundation Wall Framing Members and Slab-on-Grade: Deformed bars and welded wire reinforcement, galvanized finish.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Elevated concrete slabs.
- B. Floors and slabs on grade.
- C. Concrete foundations and anchor bolts for pre-engineered building.
- D. Joint devices associated with concrete work.
- E. Miscellaneous concrete elements, including bollard bases.
- F. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3006 – Waterproofing Admixture for Cast-In-Place Concrete.
- D. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- E. Section 32 1313 - Concrete Paving: Sidewalks, curbs and gutters.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- B. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete.
- C. ACI 301 - Specifications for Structural Concrete.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- F. ACI 305R - Guide to Hot Weather Concreting.
- G. ACI 306R - Guide to Cold Weather Concreting.
- H. ACI 308R - Guide to External Curing of Concrete.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- J. ACI SP-66 – ACI Design Guide.
- K. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- L. ASTM C33 - Standard Specification for Concrete Aggregates.
- M. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- N. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
- O. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).
- P. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- Q. ASTM C150 - Standard Specification for Portland Cement.
- R. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

- S. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- T. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
- U. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
- V. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- W. ASTM C685 - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
- X. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
- Y. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- Z. ASTM C1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- AA. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- AB. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
- AC. ASTM D471 - Standard Test Method for Rubber Property--Effect of Liquids.
- AD. ASTM D8139 - Standard Specification for Semi-Rigid, Closed-Cell Polypropylene Foam, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- AE. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- AF. COE CRD-C 48 - Method of Test for Water Permeability of Concrete.
- AG. COE CRD-C 513 - COE Specifications for Rubber Waterstops.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
 - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
 - 2. For chemical-resistant waterstops, provide data on ASTM D471 test results.
 - 3. For aggregates and admixtures.
- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
 - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
- D. Samples: Submit samples of underslab vapor retarder to be used.
- E. Test Reports: Submit report for each test or series of tests specified.
- F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- G. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

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

- D. For slabs required to include moisture vapor reduction admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.
- E. Preinstallation Meeting: Convene one week before starting work of this section. Review preparation and installation procedures and coordinating and scheduling required with related work.
- F. Manufacturer 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.
- G. Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
- H. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Slabs with Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for ten years.
 - 1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
 - 2. Provide warranty by manufacturer of MVRA matching terms of flooring adhesive or primer manufacturer's material defect warranty.
- C. Moisture Emission-Reducing Curing and Sealing Compound, Membrane-Forming: Provide warranty to cover cost of flooring delamination failures for 10 years.
 - 1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.
- D. Moisture Emission-Reducing Curing and Sealing Compound, Penetrating: Provide non-prorated warranty to cover cost of flooring delamination failures for 20 years.
 - 1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Formwork Design and Construction: See Section 03 1000 – Concrete Forming and Accessories

2.02 REINFORCEMENT MATERIALS

- A. See Section 03 2000 – Concrete Reinforcing.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I – General Use, Type II - Moderate or Type III - High Early Strength Portland type.
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33.

1. Acquire aggregates for entire project from same source.
- C. Lightweight Aggregate: ASTM C330.
 1. Acquire aggregates for entire project from same source.
- D. Fly Ash: ASTM C618, Class C or F Do not use "fly ash" in concrete exposed to view without Architect's approval.
- E. Calcined Pozzolan: ASTM C618, Class N.
- F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- G. Slag Cement: ASTM C 989, Grade 100 or 120.
- H. Water: ASTM C1602; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
- C. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in concrete as required for placement and workability.
- D. Do not reduce cement content because of use of admixtures.
- E. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities and types of admixtures as required to maintain quality control.

2.05 ACCESSORY MATERIALS

- A. Underslab Vapor Barrier: See Section 03 0516 – Underslab Vapor Retarder
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 1. Grout: Comply with ASTM C1107.
 2. Height Change, Plastic State; when tested in accordance with ASTM C827:
 - a. Maximum: Plus 4 percent.
 - b. Minimum: Plus 1 percent.
 3. Minimum Compressive Strength at 28 Days: 2000 pounds per square inch.
 4. Products containing aluminum powder are not permitted.
 5. Flowable Products:
 - a. Kaufman Products Inc; SureGrout: www.kaufmanproducts.net/#sle.
 - b. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; DURAGROUT: www.laticrete.com/our-products/concrete-construction-chemicals.
 - c. SpecChem, LLC; SC Precision Grout: www.specchemllc.com.
 - d. W. R. Meadows, Inc; 588-10K: www.wrmeadows.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
 6. Low-Slump, Dry Pack Products:
 - a. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; Duragrout: www.lmcc.com.
 - b. The QUIKRETE Companies; QUIKRETE® FastSet™ Non-Shrink Grout: www.quikrete.com.
 - c. SpecChem, LLC; SC Multipurpose Grout: www.specchemllc.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Architectural Concrete Floor Topping and Resurfacer:
 1. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 6,500 pounds per square inch.
 2. Manufacturers:
 - a. CTS Cement Manufacturing Corporation; TRU Self-Leveling: www.ctscement.com.

- b. SpecChem, LLC; SpecLevel PCT: www.specchemllc.com.
- c. Substitutions: See Section 01 6000 - Product Requirements.

2.06 BONDING AND JOINTING PRODUCTS

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
 - 1. Manufacturers:
 - a. Euclid Chemical Company; AKKRO-7T: www.euclidchemical.com.
 - b. SpecChem, LLC; Strong Bond Acrylic Bonder: www.specchemllc.com.
 - c. W. R. Meadows, Inc; ACRY-LOK-: www.wrmeadows.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Epoxy Bonding System:
 - 1. Complying with ASTM C881/C881M and of Type required for specific application.
 - 2. Manufacturers:
 - a. Euclid Chemical Company; DURAL FAST SET LV: www.euclidchemical.com.
 - b. SpecChem, LLC; SpecPoxy 1000, SpecPoxy 2000, SpecPoxy 3000, or SpecPoxy 3000FS: www.specchemllc.com.
 - c. W. R. Meadows, Inc.; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000: www.wrmeadows.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.
 - 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
 - 2. Height: To suit slab thickness.
 - 3. Manufacturers:
 - a. BoMetals, Inc: www.bometals.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Expansion- and Isolation-Joint-Filler Strips:
 - 1. ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- E. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
 - 1. Material: ASTM D8139, semi-rigid, closed-cell polypropylene foam.
 - 2. Manufacturers:
 - a. Nomaco, Inc; Nomaflex Expansion Joint Filler with Void Cap Option: www.nomaco.com.
- F. Waterstops: Rubber, complying with COE CRD-C 513.
 - 1. Configuration: Flat or dumbbell type as indicated on drawings.
 - 2. Size: As indicated on drawings.
 - 3. Manufacturers:
 - a. The Burke Co..
 - b. Williams Products.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- G. Dowel Sleeves: Plastic sleeve for smooth, round, steel load-transfer dowels.
 - 1. Manufacturers:
 - a. BoMetals, Inc; QuicDowel: www.bometals.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.07 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Type 1, Class B, for interior work, liquid membrane-forming compound; complying with ASTM C309.
 - 1. Manufacturers:
 - a. Euclid Chemical Company; COLOR-CRETE CURE AND SEAL VOC: www.euclidchemical.com.
 - b. Kaufman Products Inc.; Thinfilm 420 Resin Base: www.kaufmanproducts.net.
 - c. W. R. Meadows, Inc; 1100-Clear: www.wrmeadows.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

2.08 CONCRETE MIX DESIGN

- A. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- B. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- C. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.
- D. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days:
 - 1 Exterior: 4,000 pounds per square inch, unless noted otherwise. N/A.
 - 2 Interior: 3,500 pounds per square inch, unless noted otherwise.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight. Do not use fly ash in concrete exposed to view.
 - 3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
 - 4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
 - 5. Water-Cement Ratio: Maximum 40 percent by weight.
 - 6. Maximum Slump: 5 inches.
 - 7. Maximum Aggregate Size: 5/8 inch.
 - 8. Reinforcing for Slab on Grade: Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 4 lb/cu. yd.

2.09 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
 - 1. Colored Concrete: Add pigments in strict accordance with manufacturer's instructions to achieve consistent color from batch to batch.
 - 2. Fiber Reinforcement: Batch and mix as recommended by manufacturer for specific project conditions. Dispense at not less than 4 lb/cu. yd.
- B. Transit Mixers: Comply with ASTM C94.
- C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

2.10 SLUMP LIMITS

- A. Ramps/slabs/slopes = 3 inches maximum.
- B. Reinforced foundation = 1 inch to 6 inches.
- C. MDWR/HDWR = 8 inches maximum. After admixture is verified 2 inch to 3 inch slump concrete.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Verify that forms are clean and free of rust before applying release agent.
- B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in accordance with bonding agent manufacturer's instructions.
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
 - 2. Use latex bonding agent only for non-load-bearing applications.
- D. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
 - 1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings.

3.03 CONCRETE PLACEMENT

- A. General: Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R
- C. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- F. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.
- G. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- H. 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, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Notify Architect not less than 24 hours prior to commencement of placement operations.
- F. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

- G. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- H. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- I. Finish slabs level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 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 Engineer.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
 - 2. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 3. Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.
- 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 3/16-inch wide joints, at least 1 inch deep and not less than 1/4 the depth of the slab, within 4 to 12 hours after placing, when cutting action does 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 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.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness:
 - 1. Exposed Concrete Floors: 1/4 inch in 10 feet.
 - 2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
 - 3. Under Carpeting: 1/4 inch in 10 feet.
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.06 FINISHING FLOORS AND SLABS

- A. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- B. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:

1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
 2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
 3. Chamfer all exposed wall/pier edges/corners 3/4 inch, unless noted otherwise.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
 3. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/4 inch/ft. nominal.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

3.08 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.09 CONCRETE PROTECTING 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 ACI 305.1 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 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 removing forms before end of curing period, continue curing for remainder of curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
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.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
- 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.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Inspections:
 - 1. Verification of use of required design mixture.
 - 2. Concrete placement, including conveying and depositing.
 - 3. Curing procedures and maintenance of curing temperature.
- C. Concrete Tests: 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 one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd, plus one set for each additional 50 cu. yd. or fraction thereof.
 - 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 mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C 31.
 - a. Cast and laboratory cure one set of five standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimen at 7 days and two specimens at 28 days.
 - a. Should the average strength of the two specimens fall below the design strength a third 28 day specimen shall be tested. If average is still below the design strength the final specimen shall be tested.
 - b. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - 7. Strength of each concrete mixture will be satisfactory if the average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 - 8. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain

Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. 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 Engineer.
10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
11. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.11 DEFECTIVE CONCRETE

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

3.11 PROTECTION

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

END OF SECTION

SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural steel framing members.
- B. Structural steel support members, sag rods, and struts.
- C. Base plates, shear stud connectors and expansion joint plates.
- D. Grouting under base plates.

1.02 RELATED REQUIREMENTS

- A. Section 05 2100 - Steel Joist Framing.
- B. Section 05 3100 - Steel Decking.

1.03 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual.
- B. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- C. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
- D. ASTM A123- Standard Specification for Zinc Coatings on Iron and Steel Products.
- E. ASTM A242 - Standard Specification for High-Strength Low-Alloy Structural Steel.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- G. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- H. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- I. ASTM A514 - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
- J. ASTM A529 - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
- K. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- L. ASTM A992 - Standard Specification for Structural Steel Shapes.
- M. ASTM D6386 – Practice for preparation of Zinc Coated Iron and Steel Product and Hardware Surfaces for Painting.
- N. ASTM F3125 - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
- N. ASTM F436 - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.
- O. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series.
- P. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- Q. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- R. AWS D1.1 - Structural Welding Code - Steel.
- S. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel.

- T. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
 - 2. Connections not detailed.
 - 3. Indicate cambers and loads.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
 - 5. Before any materials of this Section are delivered to the Job Site, submit complete Shop Drawings to the Architect for review. Use of Contract Documents as erection of shop drawings is not acceptable.
 - 6. Show complete details and schedules for the fabrication, shop assembly and erection of all structural steel, including cuts, copes, connections, holes, bearing, anchorage, rivets, bolts, welds, etc.
 - 7. Show all welds, both shop and field, by the currently recommended symbols of the American Welding Society, showing type, size and length. Notes such as "Tack Weld" are not acceptable.
 - 8. Where reference is made to manufacturer's specifications, directions or instructions, provide copies with shop drawings for reference and review.
 - 9. Architect's review of shop drawings will be for general considerations only. Compliance with requirements for materials fabrication and erection of structural steel is the Contractor's responsibility.
 - 10. Architect's review of shop drawings will be for conformance with the design requirements of the project and does not constitute the Architect's acceptance of responsibility for the design, configuration or erection safety of connections designed by the fabricator's Engineer as part of his preparation of the shop drawings.
 - 11. For structural-steel connections indicated to comply with design loads, include structural analysis data, signed and sealed by the qualified professional engineer responsible for their preparation.

1.05 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Conflicting Requirements
 - 1. In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these Specifications, the provisions of the more stringent shall govern.
- C. Measurements
 - 1. The Contractor shall be fully responsible for accuracy of all measurements and shall verify all dimensions given on the drawings, and shall make such field measurements as are necessary to layout the work properly.
- D. Qualifications for Welding Work:
 - 1. Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure".
 - 2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
 - a. If recertification of welders is required, retesting will be Contractor's responsibility.
- E. Quality Control
 - 1. The Contractor is responsible for all quality control and will be responsible for all corrections of structural steel which does not conform to the specified requirements.
- F. Detailing of Members

1. All details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at the site wherever possible without causing delay in the work.
 2. Promptly notify the Architect wherever the design of members for any portion of the structure is not clearly indicated.
- G. Maintain one copy of each document on site.
- H. Fabricator: Company specializing in performing the work of this section with minimum five years of documented experience.
- I. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
- J. Erector: Company specializing in performing the work of this section with minimum five years of documented experience.
- K. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel Angles and Plates: ASTM A36.
- B. Steel W Shapes and Tees: ASTM A992.
- C. Rolled Steel Structural Shapes: ASTM A992.
- D. Steel Shapes, Plates, and Bars: ASTM A242 high-strength, corrosion-resistant structural steel.
- E. Steel Shapes, Plates, and Bars: ASTM A529 high-strength, carbon-manganese structural steel, Grade 50.
- F. Cold-Formed Structural Tubing: ASTM A500, Grade C.
- G. Hot-Formed Structural Tubing: ASTM A501, seamless or welded.
- H. Steel Bars: ASTM A108.
- I. Steel Plate: ASTM A514.
- J. Steel Sheet: ASTM A1011, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.
- K. Pipe: ASTM A53, Grade B, Finish black.
- L. Sag Rods: ASTM A36.
- M. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153, Class C.
- N. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125, Type 1, with matching compatible ASTM A563 nuts and ASTM F436 washers.
- O. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563
- P. Headed Anchor Rods: ASTM A307, Grade C, plain.
- Q. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at connections requiring high-strength bolts.
- R. Welding Materials: AWS D1.1; type required for materials being welded.

- S. Provide structural supports for the operable partition. Coordinate with supplier of the operable partition, refer to Section 10 2226
- T. Grout: ASTM C1107; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 24 hours: 2,500 pounds per square inch.
 - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
 - 3. Height Change, Plastic State; when tested according to ASTM C827:
 - a. Maximum: Plus 4 percent.
 - b. Minimum: Plus 1 percent.
 - 4. Products: Subject to compliance with requirements, provide one of the following:
 - a. Euco N.S.; Euclid Chemical Co.
 - b. Crystex; L&M Construction Chemicals
 - c. Masterflow 713; Master Builders
 - d. Five Star Grout; U.S. Grout Corp.
 - e. Upcon; Upco Chem. Div., USM Corp.
- U. Galvanizing
 - 1. Hot Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel indicated for galvanizing in conformance with ASTM A 123.
 - 2. Galvanize all structural steel exposed to the exterior.
 - 3. Prior to galvanizing, where powder coated or painted finish over hot-dipped galvanizing is indicated (duplex systems), the fabricator, powder coater/ painter, and galvanizer shall meet to coordinate all requirements necessary to ensure a proper finish application.
 - 4. Do not quench or apply post treatments to galvanized steel where powder coated or painted finish (duplex systems) are specified or indicated.
 - 5. Fill vent and drain holes that will be exposed in finished work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- V. Shop and Touch-Up Primer: Fabricator's standard red, complying with VOC limitations of authorities having jurisdiction and conforming to SSPC PA2.
- W. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- X. Thermal Insulation Materials:
 - 1. Provide and install structural thermal break at all exterior-to-interior, beam and column connections as indicated on the construction documents or as otherwise indicated.
 - 2. Products: Fiberglass-reinforced laminate composite, Fabreeka-TIM, as manufactured by Fabreeka International, Inc., Stoughton, MA, (800)-322-7352.
 - a. Material shall maintain structural integrity of connections. Refer to Structural Drawings for specific Load requirements.
 - b. Provide and install thermal break washers, plates (in size indicated on construction documents), bushings, etc. in order to provide a complete structural thermal break system.
 - c. Ultimate Material Properties:
 - 1) Tensile Strength ASTM D638 11,000 psi.
 - 2) Flexural Strength ASTM D790 25,000 psi.
 - 3) Compressive Strength ASTM D695 38,900 psi.
 - 4) Compressive Modulus ASTM D695
 - 5) 1/2" thk., 291,194 psi.
 - 6) 1" thk., 519,531 psi.
 - 7) Shear Strength ASTM D732 15,000 psi.
 - 8) Thickness 1" or as indicated
 - 9) Oxygen Index ASTM D2863 21.8%
 - 10) Coefficient of Thermal Expansion ASTM D696 2.2
 - 11) Thermal Conductivity ASTM C177 1.8 BTU/Hr/ft2/in/°F.

- Y. Reinforced Thermoset Resin Structural Thermal Break Pads: High-strength structural framing accessory boards with the following characteristics.
1. Structural Performance: Provide pads capable of withstanding or transferring structural loads.
 - a. Load Types: Shear, moment, and wind loads.
 2. Pad Design: Allow for fabrication and construction tolerances, accommodating live load deflection, shrinkage, and creep of the building structure and other building movements; maintain structural steel deflections as required by applicable codes.
 3. Board Size: 48 by 96 inches.
 4. Pad Thickness: As indicated on drawings.
 5. Apparent Thermal Conductivity: K-value of 1.05 Btu-in/h sq ft degrees F when tested in accordance with ASTM C518.
 6. Compressive Strength: 40,000 psi, minimum, when tested in accordance with ASTM D638.
 7. Compressive Modulus: 673,400 psi, minimum, when tested in accordance with ASTM D695.
 8. Accessories: Manufacturer's standard bushings and washers, minimum 1/4 inch thick, designed to provide thermal break between structural steel washer/bolt and internal element.
 9. Manufacturers:
 - a. Armatherm; FRR Structural Thermal Break Material: www.armatherm.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. General
1. Provide all clips, ties, separators, bolt fittings, connections, welds and miscellaneous items as required for the complete fabrication and erection of all structural steel. All items of structural steel that are to be built into or anchored into masonry or concrete shall be completely fabricated, and shall be complete with bolts, anchors, clips for securing of adjacent masonry or concrete.
 2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
- C. Connections: Design
1. Moment connections shall be designed to develop the full moment of the beam, unless otherwise shown or noted.
 2. All other connections: Unless otherwise detailed or noted, all other beam connections shall be designed for minimum one-half of the total allowable uniform load shown in the "Allowable Load on Beams" Tables of the AISC Manual of Steel Construction, latest edition, for the given shape and span. The effect of a concentrated load near an end reaction must also be considered and an analysis of the loading and reactions made as required.
- D. Shop Connections
1. Provide all connections necessary for complete erection. Unless otherwise indicated, shop connections shall be welded.
 2. Combinations of welds and bolts in the same connection are not permitted unless otherwise detailed or approved.
- E. Welding
1. All welding shall be done by the electric arc method and in accordance with the AWS "Structural Welding Code" for procedures, appearance and quality of welds and for methods used in correcting welding work.
- F. Columns

1. All column shafts shall be one piece and without splices. Mill lower ends of all column shafts and where columns are to be capped. Provide bases, column caps and seats where required.
- G. Beams
1. Fabricate beams in single lengths between columns or other supports.
- H. Holes for Other Work
1. Provide holes required for securing other work to structural steel framing, and for the passage of other work through steel framing members as indicated on final shop drawings. Provide threaded nuts welded to framing, and other specialty items as shown to receive other work.
 2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
 3. Unless otherwise shown, holes for attachment of wood blocking shall be 1/2" diameter at 24" o.c.
- I. Fabricate structural steel members to dimensions, weights and arrangements shown on drawings, with framing according to detail drawings. Substitutions may be made using structural steel members of weights and dimensions differing from those shown if no change is made in architectural design and if substituted sections are at least equal to the original design in strength and stability as approved by the Structural Engineer.
- J. Shop connections shall be welded except as otherwise shown or specified. Where field splices are to be high-tension bolted, and if required by design stresses, increase section of members at splice point to compensate for bolt holes.
- K. Provide holes and cutting required for connection of passage of work of other sections of specifications where indicated or required by conditions. All holes and cutting shall be subject to the Structural Engineer's approval.

2.03 FINISH

- A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
- B. Shop paint all steelwork adjoining exterior walls using primer coat in minimum dry film thickness of 2 mils. Before painting, use wire brush to remove loose mill scale, rust, dirt, soil, etc. Use solvents to clean surfaces of heavy deposits of oil or grease.
- C. Surface Preparation: After inspection and before shipping, clean steelwork to be painted, remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) at Fabricator's option one of the following:
1. SP-2 "Hand Tool Cleaning"
 2. SP-3 "Power Tool Cleaning"
 3. SP-7 "Brush-off Blast Cleaning"
- D. Painting:
1. Use painting methods which will result in full coverage of joints, corners, edges and all exposed surfaces, and comply with "SSPC PS 7.10"
 2. Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.
 3. On all other structural steel work, provide a one-coat shop-applied paint system complying with "Steel Structures Painting Council (SSPC) - PS 7.01". Apply paint at a rate to provide a uniform dry film thickness of 2.0 mils.
 4. Preparation of galvanized steel indicated to have painted or powder coat finish (duplex systems):
 - a. Clean and remove all bumps, runs, drips, etc.

- b. Clean and remove all organic material by alkaline, acidic or solvent cleaning methods, rinse and dry all cleaned members.
 - c. Profile all galvanized steel indicated to be power coated/ painted using sweep blasting meeting SSPC SP16.
- E. All exterior steel, exposed or otherwise, to be galvanized

2.04 SOURCE QUALITY CONTROL

- A. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least 5 percent of bolts at each connection.
- B. Welded Connections: Visually inspect all shop-welded connections and test at least 5 percent of welds using one of the following:
 - 1. Radiographic testing performed in accordance with ASTM E94.
 - 2. Ultrasonic testing performed in accordance with ASTM E164.

PART 3 EXECUTION

3.01 ERECTION

- A. Erect structural steel in compliance with AISC 303.
- B. Temporary Shoring and Bracing
 - 1. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
 - 2. Furnish all temporary bracing and guy wires necessary to square up the building and achieve proper alignment of the structures as erection proceeds, immediately upon erecting, and leave same in place until after permanent connections and bracing are installed. If, for any reason, the permanent installation cannot be made immediately, maintain the structure in a safe, stable condition until permanent installation is made.
- C. Field weld components and shear studs indicated on shop drawings.
- D. Anchor Bolts:
 - 1. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
 - 2. Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
 - 3. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.
 - 4. Refer to Division 3 Sections for anchor bolt installation in concrete, and to Division 4 Sections for anchor bolt installation in masonry.
- E. Setting Beam/Bearing Column/Leveling Plates
 - 1. Clean concrete and masonry bearing surfaces of bond reducing materials and roughen to improve bond. Clean the bottom surface of bearing/leveling plates.
 - 2. Set loose and attached bearing/leveling plates for structural members with the use of non-shrink grout.
 - 3. Tighten anchor bolts after the supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the plate prior to packing with non-shrink grout.
 - 4. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain. Finish exposed surfaces. Protect installed materials, and allow to cure as per manufacturer's recommendations.
- F. Field Assembly:

1. Set structural members to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame of structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies
 2. Level and plumb individual members of the structure within specified AISC tolerances.
 3. Establish required leveling and plumbing measurements on the mean operating temperature of the structure. Make allowances for the difference between temperature at the time of erection and the mean temperature at which the structure will be when completed and in service.
 4. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment and the removal of paint on surfaces adjacent to field welds.
 5. Splice members only where indicated and accepted on shop drawings.
 6. Do not enlarge unfair holes in members by burning or by the use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
 7. Do not use gas cutting torches in the field for correcting fabrication errors in the primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to the Architect. Finish gas-cut sections equal to a sheared appearance when permitted.
- G. Field Connections:
1. Unless otherwise indicated, field connections shall be bolted. High strength bolts shall be used for bolted connections. Unless otherwise indicated, no connection shall have less than two bolts.
 2. Provide shims and leveling devices for connection of structural steel.
- H. High Strength Bolting: High strength bolting including materials and installation, shall comply with requirements of the specifications for structural joints using ASTM A325 bolts. Bolts shall be friction type, unless otherwise noted, and shall be designed based on allowable stresses with threads in the shear plane.
- I. Field Welding: Field welding will be permitted only where indicated on approved shop drawings or where otherwise approved in writing by the Architect. All welding shall be in accordance with the requirements outlined for shop welding.
- J. Flame Cutting: No flame cutting will be permitted without the consent of the Architect. If consent is given, flame cut members shall be finished to an acceptable appearance equal to a sheared finish.
- K. Erection Tolerance: Structural steel shall be erected plumb, level and aligned, with a tolerance not exceeding a proportional error of 1 to 500 for individual pieces.
- L. Steel Lintels: Lintels shall have no less than 8 inch bearing at ends, on minimum 3 courses solid masonry and shall be sized as indicated on the drawings.
- M. Do not field cut or alter structural members without approval of Architect.
- N. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- O. Immediately after erection, clean field welds, bolted connections, and abraded areas of the shop paint, and paint all exposed areas with the same materials as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- P. Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint in conformance with ASTM A 780.
- Q. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.
- R. Installation:
1. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction, including threaded fasteners for concrete and masonry

- inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
2. Perform cutting, drilling and fitting required for installation of miscellaneous metal items. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items, which are to be built into concrete, masonry or similar construction.
 3. Fit exposed connections accurately together to form tight hairline joints. Weld connections, which are to be left as exposed joints, but cannot be shop welded because of shipping size limitations.
 4. Grind joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
 5. Comply with AWS Code for procedures of shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
 6. No final bolting or welding shall be done until each portion of the structure has been properly aligned. Bolts shall be drawn up tight and threads set so that nuts cannot become loose. Holes for turned bolts to be inserted in the field shall be reamed in the field.
 7. Field errors shall not be corrected by burning. Protect all adjacent finished surfaces during the progress of welding. Damaged surfaces shall be replaced at the cost of this subcontractor.
 8. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
 9. At completion of the job, remove all protective coatings and devices and clean all surfaces according to recommended practices. Replace all damaged parts as directed.
 10. Field errors shall not be corrected by burning. Protect all adjacent finished surfaces during the progress of welding. Damaged surfaces shall be replaced at the cost of this subcontractor.
 11. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
 12. At completion of the job, remove all protective coatings and devices and clean all surfaces according to recommended practices. Replace all damaged parts as directed.

3.03 TOLERANCES

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

3.04 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least 5 percent of bolts at each connection.
- C. Welded Connections: Visually inspect all field-welded connections and test at least 5 percent of welds using one of the following:
 1. Radiographic testing performed in accordance with ASTM E94.
 2. Ultrasonic testing performed in accordance with ASTM E164.
- D. Refer to structural drawings and architectural statement of special inspections on drawings.

3.05 CLEAN-UP

- A. Upon completion of erection, remove all tools, equipment and rubbish resulting from erection work. All necessary clean-up shall be made to the satisfaction of the Architect.

END OF SECTION

**SECTION 05 3100
STEEL DECKING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof deck.
- B. Composite floor deck.
- C. Supplementary framing for openings up to and including 18 inches.
- D. Bearing plates and angles.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete: Concrete topping over metal deck.
- C. Section 05 1200 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- D. Section 05 1200 - Structural Steel Framing: Placement of embedded steel anchors for bearing plates in cast-in-place concrete.
- E. Section 05 2100 - Steel Joist Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- F. Section 05 5000 - Metal Fabrications: Steel angle concrete stops at deck edges.

1.03 REFERENCE STANDARDS

- A. AISI S100-07 w/S2-10 "Specifications for the Design of Cold-Formed Steel Structural Members", Including supplement 2 (Feb 2010)
- B. ANSI/ SDI RD-2010 "Design Manual for Floor Decks and Roof Decks".
- C. ASTM A36 - Standard Specification for Carbon Structural Steel.
- D. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
- F. AWS D1.1 - Structural Welding Code - Steel.
- G. AWS D1.3 - Structural Welding Code - Sheet Steel.
- H. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel.
- I. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements.
- J. SDI - Publication No. 31, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007
- K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").
- L. UL (FRD) - Fire Resistance Directory.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- C. Before any materials of this Section are delivered to the Job Site, and before any material is fabricated, submit complete Shop Drawings to the Architect for review.

1. Shop Drawings: Indicate deck plan, support locations, attachments, projections, openings, holes, cuts, reinforcement, pertinent details, edge conditions, laps, shop and field welds.
- D. Certificates: Certify that products furnished meet or exceed specified requirements.
 1. Fire resistance rating per Under Writer's Laboratory.
- E. Submit manufacturer's installation instructions.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
- G. If mechanical fasteners are used, independent test reports or evaluation reports shall be provided by the fastener manufacturer.
- H. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Fire Resistance Assemblies: Provide steel deck units classified by Underwriters Laboratories (UL) in the "Fire Resistance Directory" for design numbers indicated on the construction documents.
 1. Identify steel deck bundles with labels bearing the UL mark.
- C. Conflicting Requirements
 1. In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these Specifications, the provisions of the more stringent shall govern.
- D. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
- E. Installer Qualifications: Company specializing in performing the work of this Section with minimum three years of experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Deck:
 1. Nucor-Vulcraft Group: www.vulcraft.com.
 2. New Millennium Building Systems: www.newmill.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STEEL DECK

- A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
 1. Calculate to structural working stress design and structural properties specified.
 2. Maximum Vertical Deflection of Floor Deck: 1/360 of span.
 3. Maximum Vertical Deflection of Roof Deck: 1/240 of span.
- B. Roof Deck: Non-composite type, fluted steel sheet, wide rib, 6" o.c.:
 1. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS) Grade 33/230, with G90 galvanized coating.
 2. Prime finish at underside.
 3. Minimum Base Metal Thickness: 20 gage, 0.0359 inch.
 4. Nominal Height: 1-1/2 inch.
 5. Formed Sheet Width: 36 inch.
 6. Side Joints: Lapped, welded.

7. End Joints: Lapped, welded.
- C. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete, ribs at 12"o.c.:
 1. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS) Grade 33/230, with G90 galvanized coating.
 2. Finish: Finish bottom surface only of composite floor deck and deck accessories, except those fabricated of galvanized steel, with one coat of shop applied, baked-on prime paint finish.
 3. Span Design: Double.
 4. Minimum Base Metal Thickness: 18 gage, 0.0516 inch.
 5. Nominal Height: 1-1/2 inches.
 6. Profile: Fluted; SDI NR.
 7. Formed Sheet Width: 24 inch.
 8. Side Joints: Lapped, welded.
 9. End Joints: Lapped, welded.

2.03 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36 steel, galvanized per ASTM A123.
- B. Welding Materials: AWS D1.1.
- C. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
 1. Products:
 - a. Hilti: X-HSN 24 to secure 20 GA deck to structural steel with a 36/4 pattern.
 - b. Hilti: S-SLC 01 M HWH to secure 20 & 18 GA deck sidelaps.
 - c. Hilti: X-ENP-19 L15 to secure 18 GA deck to structural steel with a 36/4 pattern.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- D. Galvanized repair paint: MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight, for regalvanizing welds in galvanized deck.
- E. Prime paint: Unpainted top surface with manufacturer's standard, light colored, shop applied, baked-on rust inhibiting primer on bottom surface only and shall comply with ASTM A 1008.
- F. Other Materials
 1. All other materials not specifically described, but required for a complete and proper installation of metal roof deck, shall be new, suitable for the intended use, free from rust and subject to the approval of the Architect.
- G. Touch up Painting:
 1. After erection is complete, touch-up all shop priming coats damaged during transportation and erection, and prime all field welds on deck which has been shop primed, using the same paint used in shop, and apply as recommended by the manufacturer.
 2. Wire brush and clean welds and rust spots on top and bottom surfaces and decking units before touch-up painting.
 3. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
- H. Flute Closures: Closed cell synthetic rubber, 1 inch thick; profiled to fit tight to the deck.

2.04 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gage, 0.0359 inch thick sheet steel; of profile and size as indicated; finished same as deck.
- B. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.
- C. Floor Drain Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.
- B. Inspection
 - 1. Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where installation may properly.
 - 2. Verify that the metal floor deck may be fabricated and erected in strict accordance with the original design, the approved Shop Drawings and the referenced standards.
 - 3. Check supporting members for correct layout and alignment.
 - 4. Verify that surfaces to receive roof deck are free of debris.

3.02 PRODUCT HANDLING

- A. Protection
 - 1. Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
 - 2. Do not bend or mar decking.
 - 3. Store off the ground with one end elevated for drainage.
 - 4. Cover deck with waterproof material.
 - 5. Do not erect damaged floor deck.
- B. Replacements
 - 1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

3.03 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level. Erect in a safe manner in the sequence established on the reviewed Shop Drawings.
- B. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- C. On steel supports provide minimum 2 inches bearing.
- D. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
 - 1. Welding Floor Deck: Use fusion welds through 16 ga. uncoated weld washers.
 - 2. Permanently secure roof deck units to steel supporting members by electric arc welding with 5/8" minimum diameter fusion welds or elongated welds of equal strength, spaced not more than 12" on centers with a minimum of 4 welds per unit at each intermediate supporting member, minimum, and 6" on center (minimum 7 welds per unit) at end laps and building perimeter and rigid frames.
- E. Side Laps: At welded male/female side laps weld at 18 inches on center maximum.
 - 1. Sheet metal screws shall not be used for side lap fastening.
- F. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- G. At deck openings greater than 18 inches in size, provide steel angle reinforcement. as specified in Section 05 1200.
- H. Cutting and Fitting:
 - 1. Cut and fit metal roof deck units and accessories around projections through roof decking, and as required for the passage of other work through, or adjacent to, the metal roof decking.

2. Cut openings in roof deck true to dimensions using metal saws, drills or cutting torches, making cuts neat, square and trim without ragged edges.
 3. Cut openings after metal roof decking has been secured.
 4. Verify locations of openings with trades concerned.
- I. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
 - J. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
 - K. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
 - L. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
 - M. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
 - N. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
 - O. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.
 - P. Install temporary shoring, if required, before placing concrete.

3.04 REPAIRS

- A. Before concrete placement, the deck shall be inspected for tears, dents or other damage that may prevent the deck from acting as a tight and substantial form. The need for the repair or temporary shoring of damaged deck shall be determined by the Architect based on structural performance, unless aesthetics have been specifically addressed in the contract documents.
- B. Remove or replace work that does not comply with specified requirements.

3.05 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Welded Connections: Visually inspect all field-welded connections and test at least 5 percent of welds using one of the following:
 1. Radiographic testing performed in accordance with ASTM E94.
 2. Ultrasonic testing performed in accordance with ASTM E164.
- C. Additional inspecting, at the Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.
- D. Do not use deck units for storage or working platform until permanently secured in position.
- E. Assure that construction loads do not exceed carrying capacity of deck.

END OF SECTION

SECTION 05 4000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed steel stud wall and ceiling joist framing.

1.02 RELATED REQUIREMENTS

- A. Section 09 2116 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.

1.03 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members.
- E. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud and ceiling joist layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
 - 3. Design data:
 - a. Shop drawings signed and sealed by a Michigan professional structural engineer.
- E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.07 DELIVER, STORAGE, AND HANDLING

- A. Protect metal framing from rusting and damage.
- B. Deliver to the project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.
- C. Store off the ground in a dry ventilated space or protect with suitable waterproof coverings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Framing:
 - 1. CEMCO: www.cemcosteel.com.
 - 2. ClarkDietrich: www.clarkdietrich.com.
 - 3. Jaimes Industries: www.jaimesind.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Framing Connectors and Accessories:
 - 1. Same manufacturer as metal framing.
 - 2. Simpson Strong Tie; www.strongtie.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
 - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
 - a. For 16 gauge (0.0635) and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 psi; ASTM A466, A 570 or A61.
 - b. For 18 gauge (0.0635) and lighter units, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi; ASTM A466, A 570 or A61.
 - c. Provide galvanized finish to metal framing components complying with ASTM A525 for minimum G60 coating.
 - 2. "C" Shape Studs: Manufacturer's standard load bearing steel stud size, shape and gage indicated with 1.626 inch flange and flange return.
 - 3. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
 - 4. Design Loads: In accordance with applicable codes.
 - 5. Live load deflection meeting the following, unless otherwise indicated:
 - a. Exterior Walls: Maximum horizontal deflection under wind load of 1/240 of span.
 - 6. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 - 7. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- C. Shop fabricate framing system to the greatest extent possible.
- D. Deliver to site in largest practical sections.

2.03 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
 - 1. Gage and Depth: As required to meet specified performance levels.
 - 2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.

- B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
 - 1. Base Metal: As required to meet specified performance levels within maximum depths indicated.
- C. Framing Connectors: Factory-made, formed steel sheet.
 - 1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch, and factory punched holes and slots.
 - 2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 - 3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
 - a. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
 - b. Provide top track with long leg track and head of wall movement connectors; minimum track length of 10 feet.
 - c. Products:
 - 1) ClarkDietrich; Drift FastClip Slide Clip D-FCSC: www.clarkdietrich.com.
 - 2) ClarkDietrich; FastClip Slide Clip FCSC: www.clarkdietrich.com.
 - 3) Simpson Strong Tie: www.strongtie.com.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
 - 4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.
 - 5. Wall Stud Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connections where indicated on the drawings.
 - 6. Products:
 - a. ClarkDietrich; Spazzer 5400 Bridging Bar: www.clarkdietrich.com.
 - b. ClarkDietrich; FastBridge Clip: www.clarkdietrich.com.
 - c. Simpson Strong Tie: www.strongtie.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.04 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.
- C. Welding: Comply with AWS D1.1/D1.1M.

2.06 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.
- C. Water-Resistive Barrier: As specified in Section 07 2500.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

3.02 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- D. Install load bearing studs full length in one piece. Splicing of studs is not permitted.
- E. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- F. Install intermediate studs above and below openings to align with wall stud spacing.
- G. Attach cross studs to studs for attachment of fixtures anchored to walls.
- H. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- I. Touch-up field welds and damaged galvanized surfaces with primer.

3.03 INSTALLATION OF JOISTS AND PURLINS

- A. Install framing components in accordance with manufacturer's instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.
- C. Touch-up field welds and damaged galvanized surfaces with primer.

3.05 TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch.
- B. Maximum Variation of any Member from Plane: 1/8" inch.

END OF SECTION

**SECTION 05 5000
METAL FABRICATIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.

1.02 RELATED REQUIREMENTS

- A. Section 05 2100 - Steel Joist Framing.
- B. Section 05 3100 - Steel Decking.
- C. Section 05 5100 - Metal Stairs.
- D. Section 05 5133 - Metal Ladders.
- E. Section 05 5213 - Pipe and Tube Railings.

1.03 REFERENCE STANDARDS

- A. ASTM A36 - Standard Specification for Carbon Structural Steel.
- B. ASTM A48 - Standard Specification for Gray Iron Castings.
- C. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- D. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- E. ASTM A283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- G. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- H. ASTM D6386 – Standard Practice for Preparation of Zinc Coated Iron and Steel Product and Hardware Surfaces for Painting.
- I. AWS D1.1 - Structural Welding Code - Steel.
- J. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
- K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").
- L. SSPC-SP 2 - Hand Tool Cleaning.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Materials List
 - 1. Submit to the Architect a complete list of all materials including manufacturer's names, to be furnished and installed under this portion of the Work.
- C. Shop Drawings
 - 1. Submit complete shop drawings to the Architect for review.
 - 2. Show details of connections, bearings, anchorage, etc. in such manner as to supply complete details for fabrication and erection. Designate all welds with standard AWS symbols, showing type, size and length. Notes such as "Tack Weld" are unacceptable. Commence fabrication only upon receipt of approved shop drawings and verified field measurements.

1.05 QUALITY ASSURANCE

- A. Codes and Standards:

1. Design, fabrication and erection of metal fabrications shall meet the requirements of the following standards, as modified by the additional requirements specified in this Section.
 - a. "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings", American Institute of Steel Construction (AISC).
 - b. "Structural Welding Code", American Welding Society (AWS) SWS D1.1.
 - c. "Surface Preparation", "Paint Application", and "Paint" specifications of the Steel Structures Painting Council (SSPC).
 - d. ASTM D7803 "Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating".
 - e. ASTM D6386 "Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting".
- B. Field Measurements
 1. Take field measurements prior to preparation of shop drawings and fabrication, where possible.
- C. Shop Assembly
 1. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36.
- B. Wide Flange Beams: ASTM A992
- C. Steel Tubing: ASTM A501 hot-formed structural tubing.
- D. Plates: ASTM A283.
- E. Pipe: ASTM A53, Grade B Schedule 40, black finish.
- F. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- G. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- H. Welding Materials: AWS D1.1; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

- A. Miscellaneous Framing Supports, Angle Curbs, Sills, Frames, Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- B. Guard Post/Bollard: Galvanized steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

1. Fabricate guardpost from lengths of 6" I.D. extra heavy strength black steel pipe. Close bottom of pipe with a welded steel plate and provide steel rod thru anchors near bottom. Grind top of pipe flat and slightly round external edge.
 2. Furnish to Concrete Trade for filling with concrete and setting.
 3. Guard post shall extend 3'-6" below grade and 4'0" above grade and shall be hot-dipped galvanized, field painted. Color as selected by Architect.
- C. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- D. Elevator Hoistway Divider Beams and Rails: Beam sections; shop prime paint finish.

2.05 FINISHES - STEEL

- A. Prime paint steel items.
1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry or located at exterior, exposed or otherwise.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123 requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123 requirements.

2.06 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.
- C. Verify all anchor bolt locations, grouting and elevation of base and setting plates and other material set by other trades, etc., before commencing work.

3.03 STORAGE

- A. Exercise care during unloading, storage and erection to avoid damage. Dumping onto ground is not permitted. Materials stored at site shall be supported completely clear of ground and covered to avoid damage by elements.

3.04 INSTALLATION

- A. Erect materials plumb and level and maintain this condition to completion. Connect members temporarily and align completely before making permanent connections. Surfaces in contact shall be thoroughly clean when assembled. Provide necessary temporary bracing to align work properly for permanent connection and safely resist all construction dead loads. Remove bracing only after permanent connections have been made.

- B. Fastening to in-place construction: Provide anchorage devices, and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- C. Field Welding: Weld by shielded arc method, per AWS Code. Grind smooth all exposed welds, but grinding shall not reduce weld strength or required cross-section. Protect all finish material from damage due to welding.
- D. Exposed Steel: Verify the condition of exposed steel after erection. Exert particular care to provide a neat, accurate installation with all members straight and true, corners and edges square, sharp and free from burrs and irregularities, adjacent members perfectly matched and no bolts or rivets exposed. Remove erection bolts and seats and plug weld and grind smooth all holes. Obtain Architect's approval before leaving the job.
- E. Field Paint: Coat abrasions, field bolts, and field welds with contrasting color of same paint used for the shop coat. Remove all temporary guys, bracing and bracing clips and grind flush all burrs remaining, before painting. Remove all welding slag, spatter, rust and burnt paint, and wire brush clean all welds before touch-up.
- F. Preparation of galvanized steel indicated to have painted or powder coat finish (duplex systems):
 - 1. Clean and remove all bumps, runs, drips, etc.
 - 2. Clean and remove all organic material by alkaline, acidic or solvent cleaning methods, rinse and dry all cleaned members.
 - 3. Profile all galvanized steel indicated to be power coated/ painted using sweep blasting meeting SSPC SP16.
- G. Obtain approval prior to site cutting or making adjustments not scheduled.

END OF SECTION

**SECTION 06 1000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rough opening framing for doors, windows, and roof openings.
- B. Sheathing.
- C. Miscellaneous framing and sheathing.
- D. Communications and electrical room mounting boards.
- E. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Setting anchors in concrete.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings.
- C. Section 072113 – Insulated Composite Sheathing, Smart Vapor Retarder, Weather Resistive Barrier and Underlayments

1.03 REFERENCE STANDARDS

- A. APA – Engineered Wood Construction Guide
- B. AWC – National Design Specification for Wood Construction
- C. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- E. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- G. AWPA U1 - Use Category System: User Specification for Treated Wood.
- H. PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
- I. PS 20 – American Softwood Lumber Standard.
- J. SPIB (GR) - Grading Rules.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- D. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- E. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org:
 - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.

Commented [TM1]: In the future require all product data including these items

2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

1.07 JOB CONDITIONS

- A. Installer must examine the substrates and supporting structures and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 3 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS – ROUGH LUMBER

- A. Sizes: Nominal sizes as indicated on drawings.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 1. Lumber: S4S, No. 2 or Standard Grade.
 2. Boards: Standard or No. 3.
 3. Exterior Use: Pressure treated.

2.03 EXPOSED DIMENSION LUMBER

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB.
- B. Sizes: Nominal sizes as indicated on drawings.
- C. Surfacing: S4S.
- D. Moisture Content: S-dry or MC19.

2.04 CONSTRUCTION PANELS

- A. Wall Sheathing: Plywood (where noted), PS 1, Grade C-D, Exposure I. 3/4 inch thickness
- B. Wall Sheathing: Exterior gypsum sheathing (where noted), glass mat faced gypsum, ASTM

C1177/C1177M, 5/8 inch Type X fire resistant.

1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Edges: Square.
 4. Manufacturers:
 - a. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Communications and Electrical Room Mounting Boards: PS 1 A-D fire-retardant treated plywood; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.05 ENGINEERED PARPET BLOCKING SYSTEM (Alternate)

- A. Acceptable Manufacturer: PreBuck, which is located at: 2555 28th St. SW; Wyoming, MI 49519; Tel: 616-309-6256; Email: request info at sales@prebuckproducts.com; Web:<http://www.prebuckproducts.com>
- B. Substitutions: See Section 01 6000 - Product Requirements.
- C. Parapet Cap Engineered Framing System: StrandGuard TimberStrand LSL 1.30E Engineered Lumber by PreBuck Engineered Framing Systems.
 1. Meets AWPA U1-15 for Use Category 2 (UC2).
 2. NAHB Research Center Green Approved.
 3. MDI resin, 100 percent waterproof when cured.
 4. Treated with zinc borate through complete cross section.
 5. Typical material 1-1/2 inches (38 mm) thick; built-up as required.
 6. Round 1-1/4 inch counter sunk anchor openings at 24 inches O.C.
 7. Acceptable for direct contact with concrete, non-corrosive to metals, insect and fungi resistive.
 8. Materials: StrandGuard TimberStrand LSL 1.30E Engineered Lumber, ICC ESR-1387.
 - a. Treatment: Zinc borate through complete cross section.
 - b. Bending Strength: 1900 psi.
 - c. Tensile Strength: 1075 psi.
 - d. Shear Strength: 150 psi.
 - e. Compression - Perpendicular to Grain: 670 psi.
 - f. Specific Gravity: 0.50 into the face, 0.42 into the edge.
 - g. R-value of 1-1/2 inch thickness (ASTM E 518): 1.86.

2.06 ACCESSORIES

- A. Fasteners and Anchors:
 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 2. Drywall Screws: Bugle head, hardened steel, power driven type, length to achieve full penetration of sheathing substrate.
- B. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.
 1. Manufacturers:
 - a. Franklin International, Inc; Titebond Heavy Duty Construction Adhesive: www.titebond.com.
- C. Sill Plate Gasket/Sealer: Provide flexible polyethylene foam, plate width, closed cell gasketing strip between top of foundation and sill plate, from continuous rolls.
 1. Product: STYROFOAM Sill Seal Foam Gasket as manufactured by DuPont de Nemours, Inc.
 2. Elastomeric sealant under sill plate seal; (2) rows continuous (alternating above and below). Hilti CP506, Tremco Acoustical Curtainwall Sealant, or Sashco Lexel, or Architect approved equal.

- D. WRB/Air Barrier- Transition Flashing: See Section 07 2100 Thermal Insulation
- E. Substitutions: Substitutions: See Section 01 6000 - Product Requirements.

2.07 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications as indicated on drawings.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Fire Retardant Treatment:
 - 1. Manufacturers:
 - a. Lonza Group: www.wolmanizedwood.com.
 - b. Hoover Treated Wood Products, Inc: www.frtw.com.
 - c. Koppers, Inc: www.koppersperformancechemicals.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Preservative Treatment:
 - 1. Manufacturers:
 - a. Koppers Performance Chemicals, Inc: www.koppersperformancechemicals.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber exposed to weather.
 - c. Treat lumber in contact with roofing, flashing, or waterproofing.
 - d. Treat lumber in contact with masonry or concrete.
 - e. Treat lumber less than 18 inches above grade.
 - f. Treat lumber in other locations as indicated.
 - 3. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - b. Treat plywood in contact with roofing, flashing, or waterproofing.
 - c. Treat plywood in contact with masonry or concrete.
 - d. Treat plywood less than 18 inches above grade.
 - e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

A.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.
- B. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- C. Install sill gasket under sill plate of wood or metal stud framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts and seal.
- D. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.
- D. Install flashing per manufacturers installation instructions.

3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.
 - 7. Chalkboards and marker boards.
 - 8. Wall paneling and trim.
 - 9. Joints of rigid wall coverings that occur between studs.
 - 10. All other wall/ceiling mounted items not indicated per manufacturer's requirements.

3.04 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.05 INSTALLATION OF CONSTRUCTION PANELS

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.
 - 1. No nails to be used with metal studs.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.
 - 4. Size and Location: As indicated on drawings.

3.06 SITE APPLIED WOOD TREATMENT

- B. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- C. Allow preservative to dry prior to erecting members.
- D. Field treat all field cuts with product used for initial wood treatment.

3.07 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.08 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
 - 1. Provide testing and inspection required by ABAA QAP.
 - 2. Notify in ABAA writing of schedule for air barrier work. Allow adequate time for testing and inspection.
 - 3. Cooperate with ABAA testing agency.
 - 4. Allow access to air barrier work areas and staging.
 - 5. Do not cover air barrier work until tested, inspected, and accepted.

3.09 CLEANING

- A. Waste Disposal:
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

**SECTION 06 2000
FINISH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Finish carpentry items.
- B. Wood casings and moldings.
- C. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry.
- B. Section 08 1113 – Hollow Metal Doors and Frames
- C. Section 08 4113 – Aluminum Framed Entrance & Storefronts
- D. Section 08 7100 – Door Hardware.
- E. Section 09 9000 - Painting.
- F. Section 10 2800 – Toilet Room Accessories.
- G. Section 12 3200 – Plastic Laminate Casework.
- H. Section 12 3600 – Countertops & Window Stools.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- B. ANSI A135.4 - American National Standard for Basic Hardboard.
- C. ANSI A208.1 - American National Standard for Particleboard.
- D. ASTM C1036 - Standard Specification for Flat Glass.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
- F. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.
- G. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1.
- H. BHMA A156.9 - American National Standard for Cabinet Hardware.
- I. NEMA LD 3 - High-Pressure Decorative Laminates.
- J. PS 1 - Structural Plywood.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 PERFORMANCE REQUIREMENTS

- A. Engineered Wood Products:
 - 1. Provide products with no added urea formaldehyde; determine formaldehyde concentrations in air from wood products under test conditions of temperature and relative humidity in accordance with ASTM D6007 or E1333.
 - 2. Bio-based Content:
 - a. Interior Panels: Engineered products designed specifically for interior applications and providing a surface that is impact-,scratch-, and wear-resistant and that does not absorb or retain moisture; provide minimum 55 percent bio-based content.
 - b. Structural Interior Panels: Engineered products designed for use in structural construction applications; provide minimum 89 percent bio-based content.

- c. Structural Wall Panels: Engineered products designed for use in structural walls, curtain walls, floors and roofs; provide minimum 94 percent bio-based content.
- 3. VOC Emissions
 - a. Provide low VOC products with Green Seal Certification to GS-36 and description of the basis for certification

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units.
 - 2. Certifications:
 - a. Indicate preservative treatment of materials meet the requirements specified.
 - b. Indicating moisture content of materials meet the requirements specified.
 - 3. Provide instructions for attachment hardware and finish hardware.
- C. Manufacturer's Instructions: Provide manufacturer's installation instructions for factory-fabricated units.
- D. Shop Drawings: Millwork: Half size scale for sections and details; 1:50 (1/4-inch) for elevations and plans.
 - 1. Indicate materials and details of construction, methods of fastening, erection, and installation.
- E. Samples: Plastic laminate, finished plywood or particleboard, (6 by 12 inches), and exterior PVC trim (6 inches long).

1.07 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- C. Protect from moisture damage.
- D. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Interior Woodwork Items:
 - 1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.
 - 2. Door, Glazed Light
 - 3. Door and Casework Hardware
 - 4. Countertops and Window Stools: Solid surface; see Section 12 3600 – Countertops
 - 5. Toilet Room Accessories.
 - 6. Loose Shelving: MDF with Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels. Color selected by Architect.
 - 7. Hanging rod for coats with concealed metal hardware.
- C. Plywood for finish carpentry shall be 3/4" overall thickness, 7-ply veneer core construction.
- D. Lumber:
 - 1. Grading and Marking:

- a. Lumber to bear the grade mark, stamp, or other identifying marks indicating grades of material.
 - b. Such identifying marks on a material to be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
 - c. The inspection agency for lumber to be approved by the Board of Review, American Lumber Standards Committee, to grade species used.
2. Sizes:
- a. Lumber size references, unless otherwise specified, are nominal sizes; actual sizes to be within manufacturing tolerances allowed by the standard under which product is produced.
 - b. Millwork, standing and running trim, and rails: Actual size as shown or specified.
3. Hardwood: FAS Grade of NHLA, species as specified for each item.
4. Softwood: PS-20, exposed to view appearance grades:
- a. Use C select or D select, vertical grain for transparent finish including stain transparent finish.
 - b. Use Prime for painted or opaque finish.
5. Use edge grain wood members exposed to weather.

2.02 PLYWOOD

- A. Softwood Plywood:
- 1. Prod. Std.
 - 2. Grading and Marking:
 - a. Each sheet of plywood must bear the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood.
 - b. The mark must identify the plywood by species group or identification index, and show glue type, grade, and compliance with PS1.
 - 3. Plywood, 13 mm (1/2 inch) and thicker; not less than five ply construction, except 32 mm (1-1/4 inch) thick plywood not less than seven ply.
 - 4. Plastic Laminate Plywood Cores:
 - a. Wet locations/sinks/lavs- Marine Grade, any species group.
 - b. Interior Type, veneer core, any species group.
 - c. Veneer Grade: A-C.
 - 5. Shelving Plywood:
 - a. Interior Type, any species group.
 - b. Veneer Grade: A-B or B-C.
 - 6. Other: As specified for item.
- B. Hardwood Plywood:
- 1. HPVA: HP-1.
 - 2. Species of Face Veneer: As shown or as specified in connection with each particular item.
 - 3. Inside of Building:
 - a. Use Type II (interior) A grade veneer for transparent finish.
 - b. Use Type II (interior) Sound Grade veneer for paint finish.
 - 4. On Outside of Building:
 - a. Use Type I, (exterior) A Grade veneer for natural or stained and varnish finish.
 - b. Use Type I, (exterior) Sound Grade veneer for paint finish.
 - 5. Species and cut as selected by Architect from manufacturer standard veneer selection.

2.03 PARTICLEBOARD

- A. ANSI NPA A208.1
- B. Plastic Laminate Particleboard Cores:
 - 1. Use Type 1, Grade 1-M-3, or Type 2, Grade 2-M-2, unless otherwise specified.
 - 2. Use Type 2, Grade 2-M-2, exterior bond, for tops with sinks.
- C. General Use: Type 1, Grade 1-M-3 or Type 2, Grade 2-M-2.
- D. Do not use product with urea formaldehyde.

2.04 PLASTIC LAMINATE MATERIALS

- A. Plastic Laminate: NEMA LD 3; interior finish carpentry as identified on drawings.
 - 1. Products:
 - a. Manufacturers:
 - a. Formica: Standard laminate; www.formica.com.
 - b. Wilsonart: Standard laminate; www.wilsonart.com
 - b. Color and texture to be chosen by Architect from manufacturer's standard selection, u.n.o..
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- A. Low Pressure Laminate: Refer to Section 12 3200 and Section 12 3600.
- C. Exposed decorative surfaces including countertops, both sides of cabinet doors, and for items having plastic laminate finish; General Purpose, Type HGL.
 - 1. Factory glued to a plywood core, u.n.o., thickness as shown or specified.
 - 2. Cover exposed edges with plastic laminate, except where aluminum, stainless steel, or plastic molded edge strips are shown or specified. Use plastic molded edge strips on 19 mm (3/4-inch) molded thick or thinner core material.
 - 3. Provide plastic backing sheet on underside of countertops, vanity tops, thru-wall counter, shelving, and sills/stools including back splashes and end splashes of countertops.
 - 4. Use backing sheet on concealed large panel surface when decorative face does not occur.
- D. Casework: Section 12 3200 - Casework.
- E. Countertops: Section 12 3600 - Countertops

2.05 FASTENINGS

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Adhesive for factory-fabricated units: Manufacturer's recommended adhesive for application.

2.06 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Lumber for Shimming and Blocking: Softwood lumber of pine species.
- C. Wood Filler: Solvent base, tinted to match surface finish color.
- D. Attachment Accessories: See Sections 08 7100 - Door Hardware, 10 2113 - Toilet Partitions, 10 2800 - Toilet Room Accessories.
- E. Interior Doors and Frames: See Sections 08 1113 -Hollow Metal Doors, 08 4113 – Aluminum Framed Entrance & Storefronts.
- F. Casework: Section 12 3200 – Plastic Laminate Casework.
- G. Countertops: Section 12 3600 – Countertops & Window Stools

2.07 HARDWARE

- A. Hardware: Comply with BHMA A156.9.
- B. Standard Shelf Brackets:
 - 1. Material: Steel.
 - 2. Size: 8 inch x 12 inch.
 - 3. Finish: Manufacturer's standard, factory-applied powder coat.
 - 4. Color: Black.
 - 5. Products:
 - a. A&M Hardware, Inc ; Standard Brackets: www.aandmhardware.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Hanger Rods and Accessories
 - 1. #770 1-1/16" O.D., heavy wall steel tubing with #734 and #735 flanges (Knap & Vogt Mfg. Co.). Provide hang rod w/ end flanges for each closet, of length to suit each installation.

- D. Access panel covers for non-rated walls shall be ABS plastic, friction fit type, model 34056 by Oatley. Refer to Mechanical and Electrical for trade specific access panels.
- E. Door Hardware: Refer to Section 08 7100 – Door Hardware.
- F. Casework Hardware: Refer to Section 12 3200 – Casework.
- G. Brackets: Refer to Section 10 9000 – Miscellaneous Specialties.

2.08 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

2.09 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 1, Lacquer, Nitrocellulose.
 - b. Stain: As selected by Architect.
 - c. Sheen: Satin.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Use concealed shims where necessary for alignment.
- E. Scribe and cut exterior finish carpentry to fit adjoining work.
- F. Refinish and seal cuts as recommended by manufacturer.
- G. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
- H. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
- I. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.03 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply one coats of preservative treatment on wood in contact with cementitious materials. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.

3.04 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Clean substrates of projections and substances detrimental to application.
- C. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed.
 - 1. Cut to required lengths and prime ends.
 - 2. Comply with requirements in Section 09 9000 - Painting.

3.05 ADJUSTING

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.
- C. Replace exterior finish carpentry that is damaged or does not comply with requirements.
- D. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- E. Adjust joinery for uniform appearance.

3.05 CLEANING

- A. Clean exterior finish carpentry on exposed and semiexposed surfaces.
 - a. Touch up factory-applied finishes to restore damaged or soiled areas.

3.06 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

**SECTION 07 2100
THERMAL INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sound absorbing batts at interior wall construction.
- B. Spray foam insulating sealant for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry

1.03 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
- G. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.05 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation in Interior Metal Framed Walls: Fiberglass batt insulation with no vapor retarder or mineral wool.
- B. Insulation at perimeter window and door shim spaces and crevices in exterior walls and roof: High density, closed cell polyurethane foam.

2.02 FOAMED-IN-PLACE INSULATION (SPRAY FOAM)

- A. Spray Foam Insulation (Openings/Gaps/Cracks): One component polyurethane next generation HFO blown medium density spray-applied polyurethane foam.
 - 1. Flame Spread Index: 15 or less, in accordance with ASTM E84
 - 2. Smoke Spread Index: 20, in accordance with ASTM E84
 - 3. Manufacturers:
 - a. Dow Chemical Company; Great Stuff Pro; Gaps and Cracks or Doors & Windows as application dictates; www.dowgreatstuff.com

- b. Substitutions: See Section 01 6000 - Product Requirements

2.03 BATT INSULATION MATERIALS

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit. Where noted as sound attenuation batts at interior wall framing.
 - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 4. Formaldehyde Content: Zero
 - 5. Basis of Design: Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation
 - 6. Acceptable Manufacturers:
 - a. CertainTeed Corporation: www.certainteed.com.
 - b. Johns Manville: www.jm.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Stone Wool Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit. Where noted as sound attenuation batts at interior wall framing (at fire rated assemblies).
 - 1. Type 1 compliant mineral fiber thermal insulation.
 - 2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 3. Formaldehyde Content: Zero.
 - 4. Basis of Design: Rock Wool; Safe'n'Sound: www.rockwool.com
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 SPRAY FOAM INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Apply insulation to the specified thickness as indicated on the drawings.
- C. When applying spray-applied polyurethane foam insulation to temperature sensitive materials such as low voltage wiring, chlorinated polyvinylchloride (CPVC), or PEX tubing consult the manufacturer Material Compatibility Sheet for the recommended application procedure.
- D. Apply foam insulation over entire area to be insulated and fill voids around doors, windows and around accessible surfaces and penetrations.
- E. Trim excess foam and remove all debris and foam particles using proper disposable practices.

3.03 BATT INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- D. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.

- E. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- F. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
- G. Tape seal tears or cuts in vapor retarder.
- H. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.
- I. Coordinate work of this section with requirements for vapor retarder specified in Section 07 2500.

3.04 MINERAL WOOL INSTALLATION

- A. Install insulation in accordance with manufacturer's written recommendations and guidelines.
- B. Install insulation to maintain continuity of thermal protection to building elements and spaces.
- C. Do not compress insulation to fit into spaces.
- D. Co-ordinate installation of firestopping insulation with Section 07 8400 - Firestopping.
- E. Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- F. Keep insulation minimum 3" from heat emitting devices such as recessed light fixtures, and minimum 2" from sidewalls of chimneys and vents.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect the sprayed foam insulation to verify the correct insulation thickness.
- C. An installation certificate documenting the foam type, manufacturer, and product name and lot/batch number, as well as any fire protective products must be completed by the contractor.
The Insulation Certificate shall be signed and dated by the contractor representative and delivered to the building owner or general contractor and or posted in a conspicuous location on the job site.

3.6 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.
- B. Do not permit subsequent work to disturb applied foam insulation.
- C. Protect installed foam insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- D. Provide temporary coverings in places where insulation is subject to abuse.
- E. Touch-up, repair, or replace damaged foam before the substantial completion phase is reached.
- F. Install all required fire protective coatings or coverings over the foam as soon as possible and according to the manufacturer's guidelines.

3.7 CLEANING

- A. Plan and coordinate the insulation work to minimize the generation of offcuts and waste.
- B. Separate waste materials in accordance with the Waste Management Plan, and to the extent economically feasible.
- C. Clean work area and remove all waste and equipment from interior and exterior spaces, leaving the project site in an orderly fashion.

END OF SECTION

**SECTION 07 9200
JOINT SEALANTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-sag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 9100 - Preformed Joint Seals.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 – Glazing.
- D. Section 09 3000 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.03 REFERENCE STANDARDS

- A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- B. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- C. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
- D. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 - 7. Sample product warranty.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection by Architect.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.06 WARRANTY

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

- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 - 1. Bostik Inc: www.bostik-us.com.
 - 2. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html.
 - 3. Franklin International, Inc: www.titebond.com.
 - 4. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
 - 1. Bostik Inc; www.bostik-us.com.
 - 2. Dow Chemical Company; consumer.dow.com/en-us/industry/ind-building-construction.
 - 3. Tremco Commercial Sealants & Waterproofing; www.tremcosealants.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Between different materials.
 - c. Other joints indicated below.
 - 2. Do not seal the following types of joints.
 - a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - c. Joints where installation of sealant is specified in another section.
 - d. Joints between suspended panel ceilings/grid and walls.
- B. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
 - 1. Type I - Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
 - 2. Type II - Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
 - 3. Type III - Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.
 - 4. Type IV - Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
 - 5. Type V - Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.
- C. Interior Wet Areas: Bathrooms, restrooms, kitchens, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.
- D. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining acrylic acoustical sealant complying with ASTM C 834.
 - 1. Manufacturers that provide products meeting the requirements of this section include, but are not limited to, the following:
 - a. Basis of Design: Hilti, Inc.; CP 506; www.hilti.com.
 - 2. Colors of Exposed Acoustical Joint Sealants: White.

2.03 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O Open Cell Polyurethane.
 - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
 - 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
 - 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
 - 5. Manufacturers:
 - a. ADFAST Corporation; ADSEAL BR-2600 (Backer Rod): www.adfastcorp.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- D. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

- A. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 POST-OCCUPANCY

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

END OF SECTION

**SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Fire-rated hollow metal doors and frames.
- C. Thermally insulated hollow metal doors with frames.

1.02 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware.
- B. Section 09 9000 - Painting

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors and Hardware Reinforcing.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- F. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- G. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- H. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- I. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- J. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
- K. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities.
- M. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.
- N. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
- O. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
- P. NFPA 105 – Standard for Smoke Door Assemblies and Other Opening Protectives.
- Q. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- R. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.
- S. UL (DIR) - Online Certifications Directory Current Edition.
- T. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.
- U. UL 263 – Standard for Safety of Fire Tests of Building Construction Materials.
- V. UL 1784 – Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Schedule of doors and frames corresponding to contract documents.
- E. Installation instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.
 - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
 - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
 - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.08 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.09 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
 - 1. CECO Door Products (C).
 - 2. Curries Company (CU).
 - 3. Steelcraft (S).
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653, cold-rolled steel complying with ASTM A1008, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Door Top Closures: Flush end closure channel, with top and door faces aligned.
 - 4. Door Edge Profile: Manufacturers standard for application indicated.
 - 5. Typical Door Face Sheets: Flush.
 - 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
 - 7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - 8. Type "S" smoke label where required.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 MATERIALS

- 1. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.
- 2. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum G60 metallic coating.
- 3. Frame Anchors: ASTM A 653, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 metallic coating.

2.04 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Type 1, Exterior Doors: Not Used.
- C. Type 2, Interior Doors, Non-Fire-Rated:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.

- d. Door Face Metal Thickness: 16 gage minimum with 22 gage reinforcement.
 - e. Zinc Coating: A60 galvanized coating; ASTM A653.
 - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 - 3. Door Thickness: 1-3/4-inch, nominal.
 - 4. Door Face Sheets: Full flush or glazed as indicated on the drawings.
 - 5. Door Finish: Factory primed and field finished.
 - a. Zinc Coating: A60 galvanized coating; ASTM A653 where exposed to water and moisture.
 - 6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 - 7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- D. Type 3, Fire-Rated Doors:
- 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500 000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 16 gage minimum with 22 gage reinforcement.
 - e. Zinc Coating: A60 galvanized coating; ASTM A653.
 - 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - 3. Provide units listed and labeled by UL (DIR).
 - a. Attach fire rating label to each fire rated unit.
 - 4. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
 - 5. Door Thickness: 1-3/4 inch, nominal.
 - 6. Door Face Sheets: Full flush or glazed as indicated on the drawings.
 - 7. Door Finish: Factory primed and field finished.
 - a. Zinc Coating: A60 galvanized coating; ASTM A653 where exposed to water and moisture.
 - 8. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 - 9. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

2.05 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Provide 16 gage closure plates on all frames.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Frame Metal Thickness: 16 gage minimum up to 48 inch wide. 14 gage where greater than 48 inch wide.
- D. Door Frames, Fire-Rated: Full profile/continuously welded type.
 - 1. Fire Rating: Same as door, labeled.
 - 2. Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
 - 3. Frame Metal Thickness: 16 gage minimum up to 48 inch wide. 14 gage where greater than 48 inch wide.
- E. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

- F. Frames in Masonry Walls: Size frame to suit masonry coursing. If required, provide 4 inch high head member to fill opening without cutting masonry units.
- G. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.06 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.06 FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.
- B. Field Finish: Complying with ANSI/SDI A250.3.
 - 1. Color (frames): Sherwin Williams-Software SW-7074
Color (Doors): Pantone PMS 7687 C Hex: #003F87, RGB: (0, 63, 135), CMYK: (100, 85, 19, 5). (Laker Blue).

2.07 ACCESSORIES

- A. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143 for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
 - 1. All grout holes to be concealed.
- B. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide factory- or shop-assembled frames.

2.08 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
 - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
 - 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
 - 3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D. Hollow Metal Frames:
1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
 3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
 5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
 7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 9. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
 10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
 11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.03 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2.Fire-Rated Doors: Install doors with clearances according to NFPA 80.

- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.04 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.05 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION

SECTION 08 4113
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
 - 1. Kawneer Aluminum Storefront System include:
 - a. Trifab™ VersaGlaze 450T Framing System – 1-3/4" x 4-1/2" (44.5 mm x 114.3 mm) nominal dimension; Non-thermal; Front, Center, Back, Multi-Plane, Structural Silicone or Weatherseal (type B) glazed; Screw Spline Fabrication.

1.3 DEFINITIONS

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG-13).

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance:
 - a. Product to comply with the specified performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction, as determined by testing of aluminum storefront systems representing those indicated for this project.
 - b. Aluminum storefront systems shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - c. Failure includes any of these events:
 - i. Thermal stresses transferring to building structure
 - ii. Glass breakage
 - iii. Loosening or weakening of fasteners, attachments, and other components
 - iv. Failure of operating units
- B. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures of based on the Michigan Building Code; 2015 Edition.
- C. Air Leakage: The test specimen shall be tested in accordance with ASTM E 283. Air Leakage rate shall not exceed 0.06 cfm/ft² (0.3 l/s · m²) at a static air pressure differential of 6.2 psf (300 Pa) with interior seal, or, rate shall not exceed 0.06 cfm/ft² (0.3 l/s · m²) at a static air pressure differential of 1.6 psf (75 Pa) without interior seal. CSA A440 Fixed Rating.
- D. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.
- E. Uniform Load: A static air design load of 35 psf (1680 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

- F. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
- G. Temperature Change (Range): 0 deg F (-18 deg C); 180 deg F (82 deg C).
- H. Test Interior Ambient-Air Temperature: [75 deg F (24 deg C)] .
- I. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5 for a minimum 3 cycles.

1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed storefront system indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.
- C. Samples for Verification: For aluminum-framed storefront system and components required.

1.6 QUALITY ASSURANCE

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

1.7 PROJECT CONDITIONS

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

1.8 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
 - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Aluminum Storefront
 - 1. Kawneer Company Inc.
 - 2. Trifab™ VersaGlaze 450 Framing System

3. System Dimensions: 1-3/4" x 4-1/2" (44.5 mm x 114.3 mm)
 4. Glass: Center.
- B. Substitutions: See Section 01 1600 – Product Requirements

2.2 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 STOREFRONT FRAMING SYSTEM

- A. Non-Thermal Barrier (Trifab™ VG 450)
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall be stainless steel.
- D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action
- E. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- F. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

2.4 GLAZING SYSTEM

- A. Glazing: As specified in Division 08 Section "Glazing".
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.

- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
 - 1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
 - a. Color: Black
 - 2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structuralsealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
 - a. Color: Matching structural sealant.
- J. Basis-of-Design Product: Sliding Aluminum Door System
 - a. Kawneer Company Inc.
 - b. Series 1010 Sliding Mall Front w/ Manuf Standard Hardware. Match existing loft/suite sliding door conditions. Match existing finishes.
- K. Substitutions: See Section 01 6000 - Product Requirements.

2.5 FABRICATION

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fit joints; make joints flush, hairline and weatherproof.
 - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.
- C. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes. B. Factory Finishing:

1. Kawneer Anodized Finish, AA-M10C21A44, Architectural Class I, Color: #29 Black.

PART 3 - EXECUTION 3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

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

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.4 ADJUSTING, CLEANING AND PROTECTION

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

END OF SECTION

**SECTION 08 7100
DOOR HARDWARE**

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included:
 - 1. Furnish hardware required to complete the work as shown on the drawings and as specified herein;
 - 2. Furnish trim attachments and fastenings, specified or otherwise required, for proper and complete installation.
 - 3. Furnish all items of Finish Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.
 - 4. These documents supersede all previous hardware specifications and shall be followed without substitution.
- B. Related work:
 - 1. Division 1 – General Requirements
 - 2. Division 6 – Rough Carpentry
 - 3. Division 6– Finish Carpentry: Installation of Finish Hardware
 - 4. Division 8 – Steel Doors and Frames
 - 5. Division 8 – Wood Doors
 - 6. Division 8 – Special Doors
 - 7. Division 8 – All Glass Entrances and Storefronts
 - 8. Division 8 – Aluminum Framed Entrances and Storefronts
 - 9. Division 26 – Electrical
 - 10. Division 26 – Smoke Detection Systems
 - 11. Division 26 – Security Access Systems
- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:
 - 1. Cabinet Hardware.
 - 2. Signs, except as noted.
 - 3. Folding partitions, except cylinders where detailed.
 - 4. Sliding aluminum doors
 - 5. Chain link and wire mesh doors and gates
 - 6. Access doors and panels
 - 7. Overhead and Coiling doors

1.2 REFERENCES

- A. National Fire Protection Associations (NFPA):
 - 1. NFPA 101-2015, "Life Safety Code"
 - 2. NFPA 80-2013, "Installation of Fire Doors and Windows"
- B. Michigan Building Code -2015
- C. American National Standards Institute (ANSI):

1. ANSI A 156 Standards series.
2. ICC/ANSI A117.1-2015 Accessible and Usable Buildings and Facilities.

1.3 DEFINITIONS

- A. "Finish Hardware": Items required for swinging, sliding and folding doors, except special types of unique and non-matching hardware specified under door and frame Sections of these Specifications.

1.4 SYSTEM DESCRIPTION

- A. Design requirements:

1. Review of hardware requirements:
 - a. Thoroughly review finish hardware schedule, comparing it with the floor plan, door schedule, and door details to verify hardware requirements, quantities, door swings, finishes, and sizes.
 - b. If an inconsistency or error in the proposed construction documents is suspected, the hardware supplier is to bring it immediately to the attention of the Architect. If the quantity of items is questioned, for bidding purposes, assume the higher quantity is required and price accordingly.
 - c. Architect's review of Submittals is for design concept only, and does not relieve the Contractor of the responsibility to furnish sufficient material and functions required for a complete and code-worthy installation.

Determination of all quantities is the responsibility of the Contractor.

- d. Where existing frames remain, survey existing opening and verify that existing hinge, strike, other hardware preps are consistent with what is specified. Notify architect immediately if any inconsistencies are found. Patch, fill and repair the existing door preps as required, and prep the frames to accept new hardware items. Where inconsistencies with hinge sizes and locations exist, provide compatible items that will fit the existing frames.

- B. Performance requirements:

1. Furnish finish hardware complying with the requirements of laws, codes, ordinances and guidelines of governmental authorities having jurisdiction:
 - a. NFPA 101, "Life Safety Code", 2015 edition
 - b. NFPA 80, "Installation of Fire Doors and Windows", 2018 edition
 - c. Michigan Building Code -2015
 - d. ICC/ANSI A117.1-2015 Accessible and Usable Buildings and Facilities

1.5 SUBMITTALS:

- A. Hardware Schedule

1. Submit number of Hardware Schedules as directed in Division 1.
2. Follow guidelines established in Door & Hardware Institute Handbook (DHI) Sequence and Format for the Hardware Schedule unless noted otherwise.
3. Schedule will include the following:
 - a. Door Index including opening numbers and the assigned Finish Hardware set.
 - b. Preface sheet listing category only and manufacturer's names of items being furnished as follows:

CATEGORY	SPECIFIED	SCHEDULED
Hinges	Manufacturer A	Manufacturer B
Kick Plates	Open	Manufacturer Z

- c. Hardware Locations
- d. Opening Description: Single or pair, number, room locations, hand, active leaf, degree of swing, size, door material, frame material, and UL listing.
- e. Hardware Description: Quantity, category, product number, fasteners, and finish.
- f. Headings that refer to the specified Hardware Set Numbers.
- g. Scheduling Sequence shown in Hardware Sets.
- h. Product data of each hardware item, and shop drawings where required, for special conditions and specialty hardware.
- i. "Vertical" scheduling format only. "Horizontal" schedules will be returned "Not Approved."
- k. Typed Copy.
- l. Double-Spacing.
- m. 8 1/2 x 11 inch sheets
- n. U.S. Standard Finish symbols or BHMA Finish symbols.

B. Product Data:

- 1. Submit, in booklet form Manufacturers Catalog cut sheets of scheduled hardware.
- 2. Submit product data with hardware schedule.

C. Samples:

- 1. Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware; if requested by the architect; submit one sample, if required, of each type of exposed hardware unit, finished as required and tagged with full description for coordination with schedule.
- 2. Samples will be returned to the supplier. Units, which are acceptable and remain undamaged through submittal, review and field comparison procedures, may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

D. Submit to General Contractor/Construction Manager, the factory order acknowledgement numbers for the various hardware items to be used on the project. The factory order acknowledgement numbers shall help to facilitate and expedite any service that may be required on a particular hardware item. General

Contractor/Construction Manager shall keep these order acknowledgement numbers on file in the construction trailer.

1.6 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the requirements and the methods needed for proper performance of the work of this Section.

B. Supplier qualifications:

- 1. A recognized architectural finish hardware supplier with its' parent company located within 250 miles of the project site.

2. Continuously in business of finish hardware supply for not less than 5 years.
- C. Provide the service of a certified AHC (Architectural Hardware Consultant) to:
 1. Be available for consultation with the Architect at no additional cost to the Owner during progress of construction, and:
 - a. Inspect installation of all finish hardware items;
 - b. Make all minor adjustments required; and
 - c. Report to the Architect on completeness of the installation.
 2. The hardware consultant may be an employee of the supplier.
- D. Installer qualifications: Employ a competent hardware installer with at least five (5) years experience installing commercial grade hardware similar to that proposed for the Work.
- E. Source limitations: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements. Products listed within these documents shall be used without substitution.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01620.
- B. Product identification:
 1. Tag and mark each item separately in manufacturers unopened package, identifying it by product number and architectural opening number, as listed in the approved Finish Hardware Schedule.
 2. Include instructions, templates, and fasteners needed for installation.
- C. Deliver individually packaged hardware items on a vehicle operated by a direct employee of the Hardware Supplier. Contractor shall immediately, and in the presence of the Hardware Supplier, inventory the contents of the delivery.
- D. Hardware supplier: Furnish finish hardware items directly to the factory or mill for factory-installation, where required.

1.8 PROJECT CONDITIONS

- A. Provide a secure, well lit, dry storage area for the sole purpose of storing finish hardware. Prohibit access to all jobsite personnel, except those employed by the installing contractor.

1.9 WARRANTY

- A. Manufacturer's warranty:
 1. Standard manufacturer's warranties apply for products listed in Part 2 products.
 2. Refer to Division 1 for further warranty requirements.
- B. During the warranty period, replace defective work, including labor, materials and other costs incidental to the work. Replace work found to be defective as defined in the General Conditions.
- C. Failures due to defective materials or workmanship to include, but not to be limited to:
 1. Failures in operation of any operating component;
 2. Defects which contribute to unsightly appearance, potential safety hazard, or potential untimely failure of the products furnished under this Section.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each finish hardware item is indicated in the Finish Hardware Schedule at the end of this Section.
- B. Product designations:
 - 1. One or more manufacturers are listed for each hardware type required. Product listed is for basis of design. Only products listed in part 2 product descriptions will be allowed for substitution.
- C. ANSI/BHMA designations:
 - 1. Used to describe hardware items, or to define quality or function. Provide products complying with these standards in addition to additional requirements of this Section.
- D. Hand of door: Drawings show direction of slide, swing ("hand") of door leaves.
- E. Hardware: Use hardware manufactured to conform to published templates and, generally, prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

2.2 MATERIALS

- A. Base metals:
 - 1. Manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially-recognized) quality than that specified for applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated.
 - 2. Do not furnish "optional" materials for those indicated, except as otherwise specified.
- B. Fasteners:
 - 1. Furnish Phillips flat-head screws with each hardware item, unless otherwise indicated.
 - 2. Exposed screws: Match finish of hardware (even where noted to be "prepared for paint").
 - 3. Use concealed fasteners for hardware units which are exposed when door is closed, except where no standard units of type specified are available with concealed fasteners.
 - 4. Do not use thru-bolts where bolt head or nut on opposite face would be exposed.
 - 5. Where adequate reinforcement is not feasible, thru-bolting would only be acceptable if through sleeves, or if sex-screw fasteners are used.
- D. Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.3 MANUFACTURED UNITS, GENERAL

- A. Reference standards:
 - 1. Comply with BHMA/ANSI A156 current series for each product type.
- B. Hardware finishes:
 - 1. Materials and Finishes Standard: Comply with ANSI A156.18 Finish designations used in schedules are listed, therein.
 - 2. Provide matching finishes for hardware units at each door, unless otherwise indicated.
 - 3. Match the color and texture of hardware items to manufacturer's standard finish for the latchset, lockset, or push-pull unit.

4. Provide quality of finish, including thickness of plating or coating, composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than that specified or described by referenced standards.
- C. Hardware for fire-rated openings:
1. Comply with NFPA 80
 2. Tested and listed by Underwriters Laboratory (UL), or Factory Mutual (FM) for type, size and use of door, and complying with requirements of door and door frame label.
 3. Provide UL or FM label on door indicating "Fire door to be equipped with fire-exit hardware".
 4. Provide UL or FM label on exit device indicating "Fire Exit Hardware".

2.4 PRODUCTS

- A. Provide products as per Finish Hardware Schedule.

2.5 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.6 HARDWARE FINISHES

- A. General:
1. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible and except as otherwise indicated.
 2. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening.
 3. In general, match items to the manufacturer's standard finish for the latch and lock set (or push/pull units if no latch/lock sets) for color and texture.
 4. Provide finishes matching those established by BHMA or, if none established, match the Architect's sample.
 5. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than that specified for the applicable units of hardware by referenced standards.
 6. Finish designations used in schedules and elsewhere listed in ANSI A156.18 "Materials and Finishes Standard", including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
- B. Provide finish per LSSU standards, unless otherwise scheduled.
- C. Base material: Manufacturer's standard.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.3 INSTALLATION

A. General:

1. Install each item in its proper location firmly anchored into position, level and plumb, and in accordance with the manufacturer's recommendations.
2. Handing, hardware heights, locations, and degree of opening swing are indicated in the Drawings and Finish Hardware Schedule.
3. Mount finish hardware units:
 - a. At recommended heights and locations as shown in approved finish hardware schedule, complying with requirements of the A.D.A., and pertinent provisions of the Building Code.
 - b. To function at proper degree of opening of doors as indicated on approved finish hardware schedule.
 - c. By manufacturer's template.
 - d. Prior to final finishing of the door. Remove hardware to allow finishing of door, and permanently reinstall hardware upon completion of finishing operation.
3. Reinforce, where necessary, the substrate to assure proper attachment.
4. Drill and countersink units which are not factory-prepared for anchorage fasteners.
5. Space fasteners and anchors in accordance with industry standards.

B. Installing closers:

1. Mount closers per manufacturer's template and secure the Architect's approval of the closer installation.
2. The Contractor will be required to replace doors onto which closers are improperly mounted at no additional cost to the Owner. Repair or patching of such doors will not be acceptable.

C. Installing Stops: Install all wall stops into reinforced wall or stud. Projection type wall stops should be mounted 80" from finish floor, with sloped portion of the stop facing up / flat side down. Install floor stops out of the way foot traffic at a height high enough to accommodate any ramp or uneven floor condition.

D. Installing thresholds at exterior doors: Set in full bed of butyl-rubber, or polyisobutylene mastic sealant.

E. Installing weatherstrip: Install weatherstrip prior to installing closers, OH Stops or panic hardware. Template closers and panic devices from weatherstrip and install all closer / OH Stop shoe brackets and panic device strikes onto the weatherstrip without notching or cutting the weatherstrip.

F. Installing Sweeps: Install all sweeps on exterior side of opening.

3.4 FIELD QUALITY CONTROL

- A. Inspection of final hardware installation: The Contractor, hardware suppliers, and Architectural Hardware Consultant (AHC) shall thoroughly check the quality of the installation and the functionality of each unit of finish hardware at all openings in the Work. The Hardware Supplier shall forward a detailed written report of all operational or installation deficiencies to the Architect and Contractor.

3.5 CLEANING AND ADJUSTING

- A. Check and adjust each item of hardware and each door upon completion of final installation. Verify proper function and replace units which cannot be made to operate freely and smoothly, as intended for the application.
- B. Clean adjacent surfaces soiled by hardware installation.

3.6 FINISH HARDWARE SCHEDULE

General notes:

1. Contractor shall verify all existing field conditions and notify architect immediately if that which exists differs from that which is shown on drawings.
2. All work to comply with current Federal, State and Local codes, laws and ordinances. The requirements of ICC/ANSI A117.1 and the Americans with disabilities act (ADA) are to be fully satisfied. All work shall meet the most stringent requirements of both including, but not limited to clearances, limitations, accessories, etc.
3. These drawings are prepared in accordance with the limited services for which the architect was contracted. The architect makes no representation that the interpretation of these documents will result in complete compliance with the ADA.
4. All doors required to be labeled shall be set in labeled frames and identified with UL label and be provided with approved self-closing devices and positive latching hardware.
5. All designated exit doors shall be equipped with the required egress hardware.
6. Furnish hardware as scheduled without substitution, no alternates will be approved.
7. Provide combined cylinders and cut keys; keyed to Owners' Master System. Include key conference and key system schedule. Furnish a keyed cylinder and two cut keys for each locking device specified; plus four master keys.
8. Furnish and provide all necessary reinforcements, brackets, fasteners, spacers and fillers to provide a complete functioning opening.
9. Provide complete shop drawings, submittals and cut sheets complying with DHI prescribed methods and vertical format double spaced hardware schedule.
10. Hardware Sets:

*ALL HARDWARE FINISHES TO MATCH EXISTING. CONTRACTOR TO VERIFY IN FIELD W/ ARCHITECT DURING SUBMITTAL PROCESS.

Hardware Set 1 – Classroom Lock [Lock / Unlock]

3 ea.	Butt Hinge BB81 4 ½" x 4 ½" NRP	26D	PBB
1 ea.	Classroom Lock MR 148 BJSJ	32D	PDQ
1 ea.	Combinated Mortise Cylinder, Match Existing Keying	26D	---
1 ea.	Wall Stop 1407	26D	Don Jo

Hardware Set 2 – Western Integrated Sliding Door w/ Lock & Ladder Pull [Lock / Unlock]

1 ea.	AlumaGlide frame, sliding door x fixed panel system	Black	West Int
	Option B sliding door x ¼" Temp glass x Soft Close + lock mullion		
1 set	Straight Ladder Pull OPL5190 x OPL5190 BTB Mount	622	Don Jo
1 ea.	Sliding Door Lock 2331	622	Adams Rite
1 ea.	Inside Thumb Turn I12607 + collar	622	PDQ
1 ea.	Combinated Mortise Cylinder, Match Existing Keying	26D	----

Note: Provide all necessary track, hanger, guides, stops for a complete sliding door system.

END OF SECTION

**SECTION 08 8000
GLAZING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glazing units.
- B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 – Hollow Metal Doors and Frames.
- B. Section 08 1416 – Flush Wood Doors.
- C. Section 08 4110 – Interior Aluminum Storefront.
- D. Section 08 4111 – Exterior Aluminum Storefront.
- E. Section 08 8813 – Fire-Rated Glazing

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- E. ASTM C1036 - Standard Specification for Flat Glass.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
- I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- J. GANA (GM) - GANA Glazing Manual.
- K. GANA (SM) - GANA Sealant Manual.
- L. GANA (LGRM) - Laminated Glazing Reference Manual.
- M. IGMATM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use.
- N. NFRC 100 - Procedure for Determining Fenestration Product U-factors.
- O. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
- P. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene a pre-installation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling, and installation requirements.

- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 12 by 12 inch in size of glass units.
- E. Shop Drawings: Indicate glazing sizes and locations.
- F. Installer's Qualification Statement.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.07 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 GLAZED UNITS

- A. Aluminum Framed Curtain Walls and Storefronts: As specified in Section 08 4110, Section 08 4111, & Section 08 9110.
- B. Glazed Openings:
 - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
 - 2. Fire-Protection-Rated Glass: Safety Certification, 16 CFR 1201, Category II.
 - a. See Section 08 8813 – Fire-Rated Glazing.
 - 3. Tint: Clear.
 - 4. Coatings: Metallic-oxide or metallic-nitride sputter coatings are applied after manufacture and heat-treatment. It is normally applied to second and third surfaces of laminated and insulating glass, where it is protected from scratching. Some manufacturers will allow use of stainless steel, chrome, and titanium-based coatings on the second surface of monolithic glass. Sputter coating offers a broader color range and is more common as a Low-E-Type coating in current use.
- C. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 - 1. Size: As indicated on drawings or by door manufacturer's standard openings.
 - 2. Glazing: 1/4 inch thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
 - 3. Exterior door and window locations: 1" insulated units.
 - a. Refer to drawings for location of safety glazing.
- D. Glazing Stops:
 - 1. Wood Doors: Metal, mitered corners, prepared for countersunk style tamper proof screws on "secure side".

2. Hollow Metal Doors: Metal, mitered corners, prepared for countersunk style tamper proof screws on "secure side".

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 2. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 3. Glass thicknesses listed are minimum.
- B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
 1. In conjunction with vapor retarder and air barrier and joint sealer materials described in other sections.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 3. Solar Optical Properties: Comply with NFRC 300 test method.

Commented [TM1]: Need to specifically state SHGC and U values for basis of design

2.03 INSULATING GLASS

- A. Manufacturer:
 1. Basis of Design: Oldcastle Building Envelope; www.obe.com.
 2. Approved Alternate: Guardian Industries; www.guardianglass.com
- B. Glass Standards:
 1. Heat-strengthened float glass shall comply with ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted), Quality Q3, Kind HS.
- C. Insulating Glass (IG)
 1. IG units consist of glass lites separated by a dehydrated airspace that is hermetically dual sealed with a primary seal of polyisobutylene (PIB) or Thermoplastic Spacer (TPS) and a secondary seal of silicone or an organic sealant depending on the application.
 2. Insulating glass units are certified through the Insulating Glass Certification Council (IGCC) to ASTM E2190.
- D. Standard Unit Performance Characteristics
 1. All locations where insulated glass is specified and/or otherwise required.
 - a. Exterior Lite: 1/4" Clear w/ SB60 Low-E on surface #2.
 - b. Cavity: 1/2" (90% Argon / 10% Air Fill).
 - c. Interior Lite: 1/4" Clear.
 - d. Tempered as required per the drawings.

Commented [TM2]: Guardian is a fabricator who provides glass to manufacturers such as Oldcastle...

2.04 GLAZING COMPOUNDS

- A. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; black color.

- C. Manufacturers:
 - 1. BASF Corporation: www.basf.com.
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Dow Corning Corporation: www.dowcorning.com/construction.
 - 4. Tremco Commercial Sealants & Waterproofing; Proglaze SSG: www.tremcosealants.com.

2.05 ACCESSORIES

- A. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
- B. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- C. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

3.04 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.05 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

**SECTION 09 2116
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Tile backing board.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry:
- B. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- C. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board.
- D. Section 09 9000_Painting

1.03 REFERENCE STANDARDS

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units.
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units.
- C. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
- E. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.
- F. ASTM C1178 - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.
- G. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units.
- H. ASTM C1396 - Standard Specification for Gypsum Board.
- I. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- J. GA-216 - Application and Finishing of Gypsum Panel Products.
- K. UL (FRD) - Fire Resistance Directory.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.

- B. Fire-Resistance-Rated Assemblies: Provide completed assemblies as indicated on the drawings.
 - 1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 WOOD FRAMING MATERIALS

- A. Dimensional Wood Framing: N/A

2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. ClarkDietrich: www.clarkdietrich.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf. Typical 20 gauge with lengths over 12 feet to be 18 gauge by width as indicated on the drawings.
 - 1. Studs: "C" shaped with flat faces.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Suspended Ceilings: USG Drywall Suspension System; www.usg.com.
 - a. System of main and cross tees with edge moldings.
 - 4. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.
- C. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.
- D. Non-structural Framing Accessories:
 - 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
 - 2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
 - a. Products:
 - 1) Basis of Design: ClarkDietrich; Pony Wall (PW): www.clarkdietrich.com.
 - 3. Framing Connectors: ASTM A653, G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
 - a. Products:
 - 1) ClarkDietrich; FastBridge Clip (FB33): www.clarkdietrich.com.
- E. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.

2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. CertainTeed Corporation: www.certainteed.com.
 - 2. Georgia-Pacific Gypsum: www.gpgypsum.com.
 - 3. National Gypsum Company: www.nationalgypsum.com.
 - 4. USG Corporation: www.usg.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Backing Board For Wet Areas: One of the following products:
 - 1. Application: Surfaces behind tile in wet areas including tub and shower surrounds and shower ceilings.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 - a. Thickness: 1/2 inch.
 - b. Products:
 - 1) Basis of Design: National Gypsum Company; PermaBase Cement Board: www.nationalgypsum.com.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.

4. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178.
 - a. Products:
 - 1) Basis of Design: National Gypsum Company; **Gold Bond eXP Tile Backer**.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.

2.04 GYPSUM WALLBOARD ACCESSORIES

- A. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
 1. Corner Beads: Low profile, for 90 degree outside corners.
 - a. Products:
 - 1) Basis of Design: Trim-Tex, Inc: www.trim-tex.com.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
 2. Architectural Reveal Beads:
 - a. Material: Extruded aluminum, clear anodized finish.
 - b. Dimension: As indicated on drawings.
 - c. Products:
 - 1) Basis of Design: Fry Reglet Corporation, Alapareta, GA., (800) 237-9773: Number DRM.
- B. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
 1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 2. Joint Compound: Setting type, field-mixed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
- C. Studs: Space studs at 16 inches on center.
 1. Extend partition framing to structure where indicated and to ceiling in other locations.
 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
 3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

3.03 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

- E. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- F. Screws: Cement board screws for metal studs, #8 x 1-1/4", 8" o.c. along edges, 12" o.c. in field.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.05 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
 - 2. Level 5: At all curved surfaces
 - 3. Level 4: All other surfaces.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.

END OF SECTION

**SECTION 09 5100
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 REFERENCE STANDARDS

- A. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- C. ASTM E580 - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit one full size samples illustrating material and finish of acoustical units.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.05 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Suspension Systems:
 - 1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

- A. Acoustical Panels, Type ACT: Mineral fiber, with the following characteristics:
 - 1. Products Provide one of the following:
 - a. Armstrong Ceramaguard Tile and Lay-in.
 - 2. Classification: Panels fitting ASTM E 1264 for type and form as follows:
 - a. Type III, mineral base with painted finish; Form 4, cast or molded.
 - 3. Size: 24-inch by 24-inches.
 - 4. Thickness: ¾-inch.
 - 5. Tile Edge: Square.
 - 6. Pattern: Panels fitting ASTM E 1264 pattern designation fissured.
 - 7. Color: White.

8. Light Reflectance Coefficient: Not less than LR 0.80
9. Noise Reduction Coefficient: NRC 0.55 (Cortega), NRC 0.65 (Cirrus)
10. Suspension System: Exposed grid.
11. Products:
 - a. Armstrong World Industries, Inc; www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635; die cut and interlocking components, with perimeter moldings, stabilizer bars, clips, and splices as required.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid with aluminum cap.
 1. Structural Classification: Heavy duty, when tested in accordance with ASTM C635.
 2. Profile: Tee; 15/16- inch face width.
 3. Finish: Baked enamel.
 4. Color:
 - a. ACT-1: White
 5. Products:
 - a. Armstrong World Industries, Inc; Prelude: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12-gage 0.08-inch galvanized steel wire.
- C. Perimeter Moldings: Same metal and finish as grid.
- D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.
- C. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636, ASTM E580, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 1. Use longest practical lengths.
- D. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

- F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- G. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- H. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units with pattern parallel to longest room axis.
- D. Fit border trim neatly against abutting surfaces.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.06 SCHEDULE

- A. Refer to schedule on drawings.

END OF SECTION

**SECTION 09 6513
RESILIENT WALL BASE**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Resilient Wall Base.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.
- D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.04 QUALITY ASSURANCE

- A. Installation Qualification: Contractors for floor covering installation should be experienced in managing commercial flooring projects and provide professional installers, qualified to install the various flooring materials specified. An installer is "qualified" if trained, or a certified by Roppe or a certified INSTALL (International Standards & Training Alliance) resilient floor covering installer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Roppe, but not less than 55 deg F or more than 85 deg F.

1.06 PROJECT CONDITIONS

- A. Install resilient products after other finishing operations, including painting, have been completed.
- B. Maintain ambient temperatures within range recommended by Roppe, but not less than 65 deg F or more than 85 deg F in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- C. Maintain the ambient relative humidity between 40% and 60% during installation.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by Tarkett, but not less than 55 deg F or more than 85 deg F.

PART 2 - PRODUCTS

2.01 RESILIENT WALL BASE MANUFACTURER

- A. Basis of Design Manufacturer: Tarkett, U.S.A.: www.tarkett.com.

2.02 RESILIENT WALL BASE PRODUCT

- A. Basis-of-Design Product:
 - 1. Johnsonite Traditional Vinyl Wall Base System. (VB)
- B. Performance requirements meets ASTM F1861 Standard Specification for Resilient Thermoset Vinyl Wall Base, Type TS, Group 1.
- C. For thickness, specify,
 - 1. 0.25".
 - 2. 1/8"

- D. For type, specify:
 - 1. With toe.
 - 2. For height, specify:
 - 3. 4". (VB) located on all walls where wood wainscotting is not located.
- E. For 4" heights, specify length: 4' lengths/120' per carton or 120' coils.
- F. For corners, specify: Manufactured inside Corners and Outside Corner.
- G. Colors and Patterns:
 - 1. VB- TB1 Peppercorn.
- H. Test Data:
 - 1. Flexibility, ASTM F137: Passes 1/4 inch mandrel.
 - 2. Resistance to light, ASTM F1515: Passes.
 - 3. Resistance to chemicals, ASTM F925: Passes.
 - 4. ASTM E84, Flame Spread and Smoke Development: Class B, ≤ 450.

2.03 INSTALLATION MATERIALS

- A. Adhesives: as recommended by Tarkett to meet site conditions.
 - 1. Tarkett 960 Cove Base Adhesive. (Porous applications).
 - 2. Tarkett 946 Premium Contact Adhesive. (Non-porous applications).

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Prepare substrates according to Tarkett's written instructions to ensure adhesion of resilient wall base.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Vacuum clean substrates to be covered by resilient products immediately before installation.

3.03 RESILIENT BASE INSTALLATION

- A. Comply with Tarkett's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation or bend at corners.

3.04 CLEANING AND PROTECTION

- A. Comply with Tarkett's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.

- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

**SECTION 09 6519
RESILIENT TILE FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring.

1.02 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's documentation for flooring and accessories:
 - 1. Technical Data for tile and adhesive.
 - 2. Installation and Maintenance.
 - 3. Installer qualifications.
 - 4. Warranty.
- C. Verification Samples: Submit one samples, 12-inch by 12-inch in size illustrating color and pattern for each resilient flooring product specified.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and that the material is of the correct style, color, quantity and run number(s).
- B. Store all materials flat and off of the floor in an acclimatized, weather-tight space between 65 to 85 degrees F.

1.05 FIELD CONDITIONS

- A. The permanent HVAC system must be on for 7 days prior to, during and after installation between 65 and 85 degrees Fahrenheit or 18 to 29 degrees Celsius.
- B. Acclimate material and adhesive at jobsite between 65 to 85 degrees F and 35 percent to 85 percent relative humidity for 48 hours prior to installation. Temperature and relative humidity should also be maintained at the same levels during installation and after installation.
- C. Keep away from heating and cooling ducts and direct sunlight.
- D. If permanent HVAC is not operational, temporary means should be used to maintain the recommended temperature and relative humidity levels.
- E. Close areas to traffic during installation of flooring and accessories.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Type LVT (Luxury Vinyl Tile):
 - 1. Manufacturer:
 - a. Basis of Design: Tarkett North America; www.tarkettna.com
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.02 RESILIENT TILE FLOORING

- A. Luxury Vinyl Tile:
- B. Collection: Tarkett LVT
 - 1. Style: iD Latitide Wood
 - 2. Color: Hickory
 - 3. Size: 6-inch inch by 48-inch.

2.03 MOISTURE MANAGEMENT SOLUTIONS

- A. Concrete substrates should be tested for Internal Relative Humidity (Rh probe method) according to ASTM F 2170 and must not exceed 90% RH.
- B. The PH of the concrete sub-floor must be between 7 and 10.
- C. Concrete with %RH <99%, MVER <=10, pH < 11
 - 1. Apply USG Advanced skim coat as necessary for patch/skim coat.
 - 2. Install flooring.
- C. Concrete with %RH >= 99%, MVER <=12, pH <= 12
 - 1. Apply Moisture Shield.
 - 2. Apply USG Advanced skim coat as necessary for patch/skim coat.
 - 3. Install flooring.
- D. Concrete with %RH >= 99%, MVER <= 17, pH > 12
 - 1. Apply Surface Prep
 - 2. Apply Moisture Shield.
 - 3. Apply MRP
 - 4. Apply USG Advanced Skim Coat as necessary for patch/skim coat.
 - 5. Install flooring.
- E. Concrete with %RH >= 99%, MVER >17, pH > 12
 - 1. Apply Moisture Shield
 - 2. Apply USG Advanced skim coat as necessary for patch/skim coat.
 - 3. Install flooring.

2.04 ACCESSORIES

- A. Adhesives:
 - 1. As recommended by tile manufacturer.
- B. Leveling and Patching Compounds: Use only Portland-based patching and leveling compounds. Do not install resilient flooring over gypsum-based patching and/or leveling compounds.
- C. MRP: Barrier Primer over concrete, old cut back adhesive, chemically abated floors or other solid surfaces

PART 3 EXECUTION

3.01 EXAMINATION

- A. Install flooring and accessories after other operations (including painting) have been completed.
- B. Acceptance of Conditions: Carefully examine all installation areas with installer/applicator present, for compliance with requirements affecting work performance.
 - 1. Verify that field measurements, product, adhesives, substrates, surfaces, structural support, tolerances, levelness, temperature, humidity, moisture content level, pH, cleanliness and other conditions are as required by the manufacturer, and ready to receive work.
- C. Substrates shall be smooth, structurally sound, permanently dry, clean and free of all foreign material such as dust, wax, solvents, paint, grease, oils, old adhesive residue, curing and hardening/ curing compounds, sealers and other foreign material that might prevent adhesive bond.
- D. Test substrates as required by manufacturer to verify proper conditions exist.
- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prior to installation, the flooring installer should plan and attend an on-site construction meeting with the General Contractor, Architect and Property Owner to review all requirements and inspect site conditions as outlined in the manufacturer's installation document, as well as to review the requirements of ASTM F710 and any relevant building codes, or local, state, or national regulations.
- B. Flooring installation should not begin until all site conditions have been assessed, testing has been completed and subfloor conditions have been approved.
- C. Prepare per manufacturer's written instructions and as follows:
 - 1. Prepare substrates to ensure proper adhesion of LVT.
 - 2. Concrete Substrates: Prepare substrate per ASTM F710.
 - a. Verify that subfloor is clean, flat, smooth, free of dirt, rust, paint, oil, wax or any contaminant that will interfere with adhesive bonding.
 - b. Mechanically remove substrate coatings that are not compatible with adhesives, such as sealers, curing, hardening or parting compounds, soap, wax, oil, etc. 1) Do not use solvents or adhesive removers.
 - c. Surface cracks, grooves, depressions, control joints or other non-moving joints, and other irregularities shall be filled or smoothed with high-quality Portland cement or calcium aluminate based patching or underlayment compound for filling or smoothing, or both.
 - 1) Do not skim-coat large areas with patching compound, especially slick power-troweled surfaces.
 - 2) Sand smooth per manufacturer's instructions.
 - d. Slick surfaces such as power-troweled concrete shall be profiled as needed to allow for a mechanical bond between the adhesive and subfloor.
 - e. Do not use gypsum-based underlayment products and do not skim coat concrete subfloors.

3.03 INSTALLATION

- A. Installation per manufacturer's written instructions and as follows:
 - 1. Layout shall be specified by Architect.
 - 2. Follow layout and ensure installation reference lines are square.
 - 3. Installation/Direction: Unidirectional 33 % offset.
 - 4. Check cartons for and do not mix dye lots.
 - 5. Adhesives: Adhere flooring to substrate using the full spread method resulting in a completed installation without gaps, voids, raised edges, bubbles or any other surface imperfections.
 - a. Select appropriate adhesive, trowel and follow manufacturer's instructions.
 - b. Periodically spot-check transfer of adhesive to back of tile during installation.
 - c. Roll floor with a 100 pound roller to ensure proper transfer of adhesive and bonding.
 - d. Protect floor from traffic per manufacturer's instructions.
 - e. Do not wet mop floor until the adhesive has properly set per written instructions.

3.04 FIELD QUALITY CONTROL

- A. Site tests and inspections:
 - 1. Inspect flooring installation for non-conforming work including (but not limited to) the following:
 - a. Lack of adhesion.
 - b. Bubbles, loose tiles or raised edges.
 - c. Dirt and debris underneath flooring.
 - d. Excessive gaps.
 - e. Improper substrate preparation (as indicated by telegraphing).
 - f. Damage to tiles, including: dents/indentations, cuts, cracks, burns or punctures.

- B. Non-conforming work per General Conditions and as follows:
 - 1. Repair or replace damaged material if not acceptable to the Architect.

3.05 CLEANING

- A. Provide progress cleaning per manufacturer's written instructions and as follows:
 - 1. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.
 - a. Clean and protect completed construction until Date of Substantial Completion.
 - b. During installation, remove wet adhesive from surface of flooring per manufacturer's instructions.
 - 2. Site: Maintain project site free of waste materials and debris.
- B. Provide final cleaning immediately prior to Date of Substantial Completion inspection per manufacturer's written instructions.
 - 1. Protection: Remove manufacturer's and other installed protection immediately prior to Date of Substantial Completion inspection, unless required otherwise.
 - 2. Clean floor with a neutral 6-8 pH cleaner.

3.06 MAINTENANCE

- A. Initial maintenance per flooring manufacturer's written instructions and as follows:
 - 1. Allow the adhesive to cure for at least 48 hours prior to wet cleaning the floor.
 - 2. Sweep, dust mop or vacuum the floor thoroughly to remove all loose dirt, dust, grit and debris. Do not use vacuums with a beater bar assembly.
 - 3. Remove any dried adhesive residue from the surface with mineral spirits applied to a clean, lint-free cloth.
 - 4. Damp mop the floor using a cleaner recommended by the flooring manufacturer.
 - 5. Thoroughly rinse the entire floor with fresh, clean water. Remove the dirty residue with a wet-vacuum or clean mop and allow the floor to dry completely.

3.07 PROTECTION

- A. Protect materials from construction operations until Date of Substantial Completion or Owner occupancy, whichever occurs first.
 - 1. Protect finished floor from abuse and damage by using heavy non-staining kraft paper, drop cloths or equivalent. Use additional, non-damaging protective materials as needed.
 - 2. Light foot traffic on a newly installed floor can be permitted after 24 hours.
 - 3. Keep heavy traffic and rolling loads off the newly installed LVT flooring for 48 hours.
 - 4. Protect the floor from rolling loads by covering with protective boards.

END OF SECTION

SECTION 09 9000
PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.
1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory-finished components:

Plastic toilet enclosures.

- b. Metal lockers.
- c. Finished mechanical and electrical equipment.
- d. Light fixtures.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

- a. Furred areas.
- b. Ceiling plenums.
- c. Pipe spaces.
- d. Duct shafts.

3. Finished metal surfaces include the following:

Anodized aluminum.

- b. Stainless steel.
- c. Chromium plate.
- d. Copper and copper alloys.
- e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:

Valve and damper operators.

- b. Linkages.
- c. Sensing devices.
- d. Motor and fan shafts.

5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

- D. Related Sections include the following:

1. Division 8 Section "Steel Doors and Frames" for factory priming steel doors and frames.

1.3 DEFINITIONS

General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.

3. Semi-Gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
4. Full Gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 SUBMITTALS

Product Data: For each paint system indicated. Include block fillers and primers.

1. Material List: 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.
 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- B. Samples for Initial Selection: For each type of finish-coat material indicated.
1. After color selection, Architect will furnish color chips for surfaces to be coated.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information: Product name or title of material.
1. Product description (generic classification or binder type).
 2. Manufacturer's stock number and date of manufacture.
 3. Contents by volume, for pigment and vehicle constituents.
 4. Thinning instructions.
 5. Application instructions.
 6. Color name and number.
 7. VOC content.
- 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 from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

- B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
- C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

Quantity: Furnish Owner with extra paint materials in quantities indicated below:

- a. Exterior: Semigloss Acrylic Enamel: 2 gal. of each color applied.

- b. Interior: Semigloss Acrylic Enamel: 5 gal. of each color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

- C. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

Benjamin Moore & Co. (Benjamin Moore).

- 2. ICI Dulux Paint Centers (ICI Dulux Paints).
- 3. PPG Industries, Inc. (Pittsburgh Paints).
- 4. Sherwin-Williams Co. (Sherwin-Williams).

2.2 PAINT MATERIALS, GENERAL

Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

- 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

- C. Colors: As selected by Architect from manufacturer's full range

2.3 INTERIOR PRIMERS

A. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.

Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than 1.2 mils.

- 2. ICI Dulux Paints; 1000-1200 Dulux Ultra Basecoat Interior Latex Wall Primer: Applied at a dry film thickness of not less than 1.2 mils.

ICI Dulux Paints; 1030-1200 Ultra-Hide PVA Interior Primer Sealer General Purpose Wall Primer: Applied at a dry film thickness of not less than 1.9 mils.

- 4. Pittsburgh Paints; 6-2 SpeedHide Interior Quick-Drying Latex Sealer: Applied at a dry film thickness of not less than 1.0 mil.

- 5. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than 1.6 mils.

- B. Interior Wood Primer for Acrylic-Enamel and Semigloss Alkyd-Enamel Finishes: Factory-formulated alkyd- or acrylic-latex-based interior wood primer.

- 1. Benjamin Moore; Moorcraft Super Spec Alkyd Enamel Underbody and Primer Sealer No. 245: Applied at a dry film thickness of not less than 1.5 mils.

- 2. ICI Dulux Paints; 3210-1200 Ultra-Hide Aquacrylic GRIPPER Stain Killer Primer Sealer: Applied at a dry film thickness of not less than 1.8 mils.

- 3. Pittsburgh Paints; 6-855 SpeedHide Latex Enamel Undercoater: Applied at a dry film thickness of not less than 1.0 mil.

- 4. Sherwin-Williams; PrepRite Wall and Wood Primer B49W200 Series: Applied at a dry film thickness of not less than 1.6 mils.

- 5. Sherwin-Williams; PrepRite Classic Interior Primer B28W101 Series: Applied at a dry film thickness of not less than 1.6 mils.

- C. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
 - 1. Benjamin Moore; Moore's IMC Alkyd Metal Primer No. M06: Applied at a dry film thickness of not less than 2.0 mils.
 - 2. ICI Dulux Paints; 4130-6130 Devshield Rust Penetrating Metal Primer: Applied at a dry film thickness of not less than 2.2 mils.
ICI Dulux Paints; 4160-6130 Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils.
 - 4. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 1.5 mils.
 - 5. Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils.
- D. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.
 - 1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04: Applied at a dry film thickness of not less than 2.0 mils.
 - 2. ICI Dulux Paints; 4160-6130 Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils.
 - 3. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils.
Sherwin-Williams; primer not required over this substrate.
Sherwin-Williams; Galvite HS B50WZ30: Applied at a dry film thickness of not less than 3.0 mils.

2.4 INTERIOR FINISH COATS

- A. Interior Flat Acrylic Paint: Factory Formulated Flat Acrylic Emulsion latex Paint for Interior Application.
 - 1. Benjamin Moore; Moorecraft Super Spec Latex Flat No. 275: Applied at a dry film thickness of not less than 1.2 mils.
 - 2. Dulux Paint, 1200 - XXXX Dulux Professional Velvet Matte Interior Flat Latex Wall & Trim Finish: Applied at a dry film thickness of not less than 1.4 mils.
 - 3. Pittsburgh Paints; 6-70 line Speed Hide Interior Wall Flat-Latex Paint: Applied at a dry film thickness of not less than 1.0 mil.
 - 4. Sherwin Williams; ProMar 200 Interior Latex Flat Wall Paint B30W200 Series: Applied at a dry film thickness of not less than 1.4 mils.
- B. Interior Flat Latex-Emulsion Size: Factory Formulated Latex Based Interior Paint.
 - 1. Benjamin Moore; Moorecraft Super Spec Latex Flat No. 275: Applied at a dry Film thickness of not less than 1.2 mils.
 - 2. Dulux Paint; 1200-XXXX Dulux Professional Velvet Matte Interior Flat Latex Wall & Trim Finish: Applied at a dry film thickness of not less than 1.4 mils.
 - 3. Pittsburgh Paints; 6-70 Line Speed Hide Interior Flat Latex Paint: Applied at a dry film thickness of not less than 1.0 mil.
 - 4. Sherwin Williams; ProMar 200 Interior Latex Flat Wall Paint B30W200 Series: Applied at a dry film thickness of not less than 1.4 mils.
- C. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel for interior application.
 - 1. Basis of Design: Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31W200 Series: Applied at a dry film thickness of not less than 1.3 mils.
 - a. PT-5: Iron Ore, SW-7069
 - b. PT-6: Match Cool Brick Red Exterior Metal.
 - 2. Benjamin Moore; Moorcraft Super Spec Latex Semi-Gloss Enamel No. 276: Applied at a dry film thickness of not less than 1.2 mils.
 - 3. ICI Dulux Paints; 1406-XXXX Dulux Professional Acrylic Semi-Gloss Interior Wall & Trim Enamel: Applied at a dry film thickness of not less than 1.5 mils.
 - 4. Pittsburgh Paints; 6-500 Series SpeedHide Interior Semi-Gloss Latex: Applied at a dry film thickness of not less than 1.0 mil.

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. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

- 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

Provide barrier coats over incompatible primers or remove and reprime.

Cementitious Materials: Prepare concrete, concrete unit masonry surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

- a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
- b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
- 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. 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.
 - c. If transparent finish is required, backprime with spar varnish.
 - d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
 - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
- 4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.

- b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
5. 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. SPECIAL ATTENTION: EXPOSED SPIRAL DUCTWORK.
- D. 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.
- E. Tinting: 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

General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

- 1. Paint colors, surface treatments, and finishes are 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. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector 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.
 - 5. 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.
 - 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 - 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 - 8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 - 9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
 - 10. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable 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. Omit primer over metal surfaces that have been shop primed and touchup painted.
 - 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.
 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.
 - D. Minimum 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. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
 - F. Mechanical items to be painted include, but are not limited to, the following:
 1. Uninsulated metal piping.
 2. Uninsulated plastic piping.
 3. Pipe hangers and supports.
 4. Tanks that do not have factory-applied final finishes.
 5. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 6. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
 7. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - G. Electrical items to be painted include, but are not limited to, the following:

Switchgear.

 2. Panelboards.
 3. Electrical equipment that is indicated to have a factory-primed finish for field painting.
 - H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
 - 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. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
 1. Provide satin finish for final coats.
 - L. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
 - M. 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 may 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. 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: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
- B. 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.
 - 1. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 2. 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 INTERIOR PAINT SCHEDULE

- A. Gypsum Board Ceilings and Ceiling Drops: Provide the following finish system over interior gypsum board surfaces:
 - 1. Flat Acrylic - Enamel Finish: Two (2) finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior flat acrylic enamel.
- B. Gypsum Board Walls: Provide the following finish systems over interior gypsum board surfaces: Eggshell finish Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior gypsum board primer.
 - b. Finish Coats: Interior eggshell acrylic enamel.
- C. Gypsum Board (Walls and Ceiling Where Epoxy is Specified): Provide the following finish systems over interior gypsum board surfaces:
 - 1. Interior Gloss Epoxy Coating: Two (2) finish coats over epoxy primer.
 - a. Primer: Interior Epoxy Primer
 - b. Finish Coats: Interior gloss epoxy coating
- D. Ferrous Metal: Provide the following finish systems over ferrous metal (Hollow Metal Doors & Frames, Steel Columns, Stairs, Pipe Railings, Ladders, etc.):
Semi-Gloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior semi-gloss acrylic enamel.
- E. Ferrous Metal Exposed Ceiling Construction
 - 1. Provide the following finish system over interior primed exposed ferrous metal ceiling construction:
 - a. Flat Dryfall Acrylic Paint: 2 finish coats over spot primer on -re-primed metal deck and steel.
 - 1) Primer: Interior Ferrous-Metal Primer
 - 2) Finish Coats: Interior Flat Dryfall Acrylic Paint

- F. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces:
Semi-Gloss Acrylic-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior zinc-coated metal primer.
 - b. Finish Coats: Interior semi-gloss acrylic enamel.
- 2. Special Attention to Spiral Ductwork in exposed areas: Thoroughly clean all exposed surfaces of ductwork of all oil, laitance, etc that would prevent adhesion of zinc-coated metal primer.
- G. All-Service Jacket over Insulation: Provide the following finish system on cotton or canvas insulation covering:
Flat Acrylic Finish: Two finish coats. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coats: Interior flat latex-emulsion size.

3.8 MECHANICAL

- A. All-Service Jacket over Insulation: Provide the following finish system on cotton or canvas insulation covering:
 - 1. Flat Acrylic Finish: Two finish coats. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coats: Interior flat latex-emulsion size.
 - b. Finish Coats: Interior waterborne clear satin varnish.
- B. Apparatus, Equipment and Equipment Supports: Provide the following finish systems:
 - 1. Semi-Gloss Acrylic-Enamel Finish: One coat over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coat: Interior semi-gloss acrylic enamel.
- C. Exposed Base Piping, Valves, Fittings and Hangers: Provide the following finish system:
 - 1. Semi-Gloss Acrylic Enamel Finish: One coat over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coat: Interior semi-gloss acrylic enamel.
- D. Grilles, Registers and Diffusers: Provide the following finish system:
 - 1. Semi-Gloss Acrylic Enamel Finish:
 - a. Primer: Interior Ferrous Metal Primer.
 - b. Finish Coats: Interior semi-gloss Acrylic Enamel.

3.9 ELECTRICAL

- A. Exterior Exposed Electrical Conduit, Fittings, Boxes and other miscellaneous exterior electrical items: Provide the following finish systems:
 - 1. Exterior Gloss Acrylic Enamel Finish: 2 finish coats over a primer.
 - a. Primer on Galvanized Items: Exterior galvanized metal primer.
 - b. Primer on Ferrous Metal: Exterior Ferrous Metal Primer.
 - c. Finish Coats: Exterior Full Gloss Acrylic Enamel.
- B. Interior Exposed Electrical Items in areas where walls and/or ceilings are painted including panels, cabinets, exposed conduit, etc: Provide the following finish system:
 - 1. Semi-Gloss Acrylic Enamel Finish: Two finish coats over primer.
 - a. Primer on Galvanized Steel: Interior zinc coated metal primer.
 - b. Primer on ferrous Metal: Interior ferrous metal primer.
 - c. Finish Coats: Interior semi-gloss acrylic enamel.

3.10 MISCELLANEOUS

- A. See drawings for additional paint finishes, faux finishes, glazing and murals.

3.12 PAINT COLOR SCHEDULE

- A. P-1: Sherwin Williams- SW-7541- Grecian Ivory.
 - a. All gypsum board walls U.N.O.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of signage is shown on the Drawings by symbols and numbers. Numbers refer to sign schedule.
- B. Forms of signage required include:
 - 1. Interior signage
 - 2. Exterior signage (site and wayfinding)
- C. Related Work Described Elsewhere:
 - 1. Electrical Trades

1.03 REFERENCES

- A. Underwriter's laboratory (UL) 746c - Standard for Safety of Polymeric Materials -- Use in Electrical Equipment Evaluations.
- B. Underwriter's laboratory (UL) 94 and 94v-0 - Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances.
- C. ASTM D 635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
- D. NAVY G 88-0-4 (C90300) - Alloy Specification for Tin Bronze.

1.04 CODE COMPLIANCE

- A. All signs shall be constructed and mounted in accordance with the latest edition of the State of Michigan Construction Code.
- B. All signs shall be constructed and mounted in accordance with the current local zoning district requirements.
- C. All signs shall be constructed and mounted in accordance with the American with Disability Act Accessibility Guidelines including but not limited to compliance with:
 - 1. Location
 - 2. Height
 - 3. Sign and font size
 - 4. Tactile requirements
 - 5. Braille requirements
 - 6. Symbol requirements

1.05 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings for fabrication and erection of signs. Include elevations, and large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.
- B. Product Data: Submit manufacturer's technical data and installation instruction for each type of sign required.
- C. Submit manufacturers standard color samples and sample of each color to be used.
- D. Submit properly identified manufacturers standard product data.
- E. Submit a complete list of all signage.

- F. Provide sample of sign for approval by the Owner and Architect.
- G. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- H. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square representing actual product, color, and patterns.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer to have a minimum of 20 year experience in manufacturing letters.
- B. Installer Qualifications: Minimum 2 year experience installing similar products.
- C. Sourcing: All signage shall be manufactured by one manufacturer.

Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship is approved by Architect.
3. Rework mock-up area as required to produce acceptable work.

1.07 PREINSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver signs for timely installation, minimizing on-site storage time.
- B. Deliver components safety packed to prevent damage.
- C. Store in secure areas, out of weather and protect from work of other trades.
- D. All packages shall identify contents.

1.09 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.11 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty against defects in materials and workmanship. Letters shall be guaranteed for the life of the business against defects.

PART 2 - PRODUCTS

2.01 INTERIOR SIGNAGE

- A. Basis of Design: As manufactured by Visual Entities, 2160 Byron Center Ave., Grand rapids, MI 49519, (616) 531-9367 Attn: Rose Boomstra rboomstra@visualentities.com
 1. Color/Style/Series: Outsert Non Modular
 - a. Mesh Collection.
 - b. Colors to be selected by Architect from manufacturers standard range. (BM) Blue Medium and (NN) Night Navy.
 - c. Match Owner standard signage template by Visual Entities enclosed for reference.
 2. Signage shall occur at all rooms and spaces, u.n.o..
 3. Signage to be verified and confirmed with Owner during submittal process.
 4. Owner to confirm installation location, numbering, and verbiage.
- B. Identification Signage:

1. Signage shall include Room Name and Room Number.
 2. Signage shall be in English.
 3. Master room numbering system. All signs shall be as described above on plaque with numbers. Owner to confirm room numbering during submittal process.
 4. Master room numbering signs shall indicate location of room on each corridor by means of room numbers and arrows.
- C. All signs, u.n.o., shall meet all ADA and ANSI requirements including but not limited to width to height ratio, stroke width to height ratio, grade to Braille marking, and mounting location.
 - D. Secure all signs with adhesive or fasteners per manufacturers requirements.
 - E. Provide ADA/ANSI compliant signage at all accessible areas as indicated on the drawings.
 - a. ADA/ANSI signage shall comply with State of Michigan Department of Technology, Management, and Budget, Design and Construction Division ADA signage standards. See attached standard.
 - b. Colors to be selected by Architect from manufacturers standard range.
 - F. Provide "EXIT" sign with raised letters and braille markings at all doors to an exit discharge, exit passageway and egress stairway per drawings.
 - G. Other interior signage and/ or locations as indicated on the drawings or as required.

2.02 EXTERIOR SIGNAGE

- A. All signs shall meet all ADA and ANSI requirements including but not limited to width to height ratio, stroke width to height ratio, grade to Braille marking, and mounting location.
- B. Secure all signs with fasteners or anchors per manufacturers requirements and project application.
- C. Provide ADA/ANSI compliant signage at locations indicated on the drawings or otherwise as required.
 1. Directional signage at all non- accessible exterior doors indicating the route to the nearest accessible entrance.
 2. Site directional/wayfinding signage:
 - a. Provide contract allowance of \$5,000
 - b. Signage to be reviewed and confirmed by Owner.

2.03 ALUMINUM VEHICULAR SIGNS

- A. Barrier Free Parking Signs
 1. Provide and install new Barrier Free Parking signs at each barrier free parking spaces shown on site plan all in accordance with the latest edition of the State of Michigan Construction Code and American with Disability Accessibility Guidelines. Signs shall be complete with concrete foundation, steel post, symbol of compliance and "van accessible" indications where required. See drawings for design and locations.
- B. Stop Signs
 1. Provide and install new reflective "Stop" signs shown on site plan in accordance with Michigan Department of State Highways and Local Ordinances. Signs shall be complete with concrete foundation and steel post.
- C. Refer to drawings for locations.

PART 3 - EXECUTION

3.01 GENERAL

- A. Locate site units and accessories where shown or scheduled, using mounting methods in compliance with the manufacturer's instruction.
 1. Install sign units level, plumb and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

3.02 INSPECTION

- A. Inspect surfaces prior to installation.
- B. Do not install materials until surfaces are acceptable.

3.03 INSTALLATION

- A. Install signs according to locations and heights as shown and detailed on the Drawings. Install signage per manufacturer's instructions.
- B. When signs are installed on glass, provide blank glass back up to be placed on opposite side of glass exactly behind sign being installed. Provide blank glass back that is the same size as sign being installed.
- C. Provide inserts and anchoring devices which must be set in concrete or other material for installation of signs. Submit setting drawings, templates, instructions and directions for installation of anchorage devices, which may involve other trades.

3.04 ALUMINUM VEHICULAR SIGNS

- A. Aluminum must be chemically etched, degreased and it must be flat and free of ragged edges. Corner radii shall be made by stamping with dies or computer routed, and all signs of the same size shall be totally uniform in size and shape.
- B. Aluminum shall have pre-punched holes for fasteners to prevent damage to signs in the field. Refer to sign mounting details for location and spacing of fasteners.
- C. Background sheeting shall be roller applied and cover the entire face surface. No air bubbles, chips, or cracks will be allowed. Edges shall be trimmed smooth.
- D. Die or computer cut copy shall be roller applied. No air bubbles, chips, or cracks will be allowed. Edges shall be smooth and burnished to prevent peeling.
- E. Clear coat sign face if exposed to ultraviolet rays.
- F. Backs and edges of signs mounted directly to concrete construction shall have two (2) coats of baked epoxy enamel paint on backside of sign to prevent cathodic reaction with the structure. Baked epoxy enamel shall be applied to pre-punched blank prior to fabricating sign.

3.05 CLEANING AND PROTECTION

- A. Clean signs. Use non-abrasive cleaning agents as recommended by the manufacturer such as soap and water or other household cleansers.
- B. Touch up exposed fasteners and connecting hardware to match color and finish of surrounding surface.
- C. At completion of sign installation, clean exposed sign surfaces. Clean and repair adjoining or adjacent surfaces that became soiled or damaged as a result of installation of signs.
- D. Correct and repair damage done to utilities during installation of signs at no additional cost to the Owner.

END OF SECTION

**SECTION 10 2800
TOILET ROOM ACCESSORIES**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Work Included
 - 1. Furnish all labor, materials and equipment required, and furnish and install all toilet accessories, complete with all incidentals required, in accordance with the Drawings and these Specifications.

1.03 QUALITY ASSURANCE

- A. Codes and Standards
 - 1. Perform all work in accordance with the Michigan Construction Code requirements for Barrier Free Design.
- B. Inserts and Anchorage
 - 1. Furnish inserts and anchoring devices which must be set in gypsum wallboard framing for the installation of toilet accessories. Coordinate delivery with other work to avoid delay.
- C. Products
 - 1. Provide products of the same manufacturer for each type of accessory unit and for units exposed in the same areas, unless otherwise acceptable to the Architect-Engineer.
 - 2. Stamped names or labels on exposed faces of units will not be permitted, except where otherwise indicated.
 - 3. Provide locks, where indicated, with the same keying for each type of accessory unit in the project wherever possible. Furnish two keys for each lock.

1.04 SUBMITTALS

- A. Materials List
 - 1. Submit to the Architect-Engineer a complete list of all materials, including manufacturers' names, to be furnished and installed under this portion of the Work.
- B. Shop Drawings
 - 1. Submit complete shop drawings to the Architect-Engineer for review.
- C. Manufacturers Data
 - 1. For information only, submit two (2) copies of manufacturer's technical data and installation instructions for each toilet accessory. Transmit copies of installation instructions to the installer.
- D. Setting Drawings
 - 1. Provide setting drawings, templates, instructions and directions for installation of anchorage devices in other work.
 - 2. Refer to drawings for required ADA mounting heights.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. For simplicity, the products of the ASI American Specialties Inc. are specified as the basis of design. Manufacturers offering products to comply with the requirements for ADA compliant toilet accessories include the following:
 - 1. Glass Supply: www.glassupply.com
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Stainless Steel: AISI, type 302/304, with satin finish, unless otherwise indicated.
- B. Galvanized Steel Mounting Devices, ASTM A386, hot-dip galvanized after fabrication.

2.03 SURFACE MOUNTED FRAMELESS MIRROR

- A. Provide at location indicated on drawings.
- B. 72"W x 48"H x ¼" 6MM glass mirror with welded, 1/16 beveled flat polished edge frameless, mounted per manufacturers spec.
- C. Glass Supply: www.glassupply.com

2.04 INSPECTION

- A. Examine the areas and conditions under which toilet accessories are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

PART 3 - EXECUTION

3.01 INSTALLER

- A. Provide anchors, bolts and other necessary anchorages and attached accessories securely to walls and partitions via solid wood blocking in locations as shown or directed.
- B. Install concealed mounting devices and fasteners fabricated of the same material as the accessories or of galvanized steel, as recommended by manufacturer.
- C. Install exposed mounting devices and fasteners finished to match the accessories.
- D. Provide theft-resistant fasteners for all accessory mountings.
- E. Secure toilet room accessories in accordance with the manufacturer's instructions for each item and each type of substrate construction.
- F. Mount all toilet accessories at heights conforming to the latest published requirements of Barrier Free Design requirements of the Michigan Construction Code.
 - 1. Install grab bars to resist downward load of 250lb min, when tested in accordance with ASTM F446

END OF SECTION

**SECTION 12 2400
WINDOW SHADES**

PART 1 GENERAL

1.01 SECTION INCLUDES

Manually operated, roll-up fabric interior window shades including mounting and operating hardware.

1.02 RELATED SECTIONS

A. Section 061000 - Rough Carpentry: Blocking for support of window shade hardware.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product specified, including:
- Preparation instructions and recommendations.
 - Installation and maintenance instructions.
 - Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - Storage and handling requirements and recommendations.
 - Mounting details and installation methods.

Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, fabric, and color, and include opening sizes and key to typical mounting details.

Selection Samples: For each finish product specified, one complete set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

Standard manufacturer's defect warranty: Standard manufacturer's warranty documents indicating compliance with requirements of Section 1.9 below.

Manufacturer's Certificates: Certify products meet or exceed specified requirements.

Shop Drawings: For each product and application, show all installation details relative to actual project conditions.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section. If manufacturer does not meet minimum experience requirement please submit life cycle test data showing minimum 2000 complete operational cycles for each year of warranty showing no failure and that shade remains fit for use as a operable shade).

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver window shades until building is enclosed and construction within spaces where shades will be installed is substantially complete.
- B. Deliver products in manufacturer's original, unopened, undamaged containers with labels intact.
- C. Label containers and shades according to Window Shade Schedule.
- D. Store products in manufacturer's unopened packaging until ready for installation.

1.06 PROJECT CONDITIONS

A. Install roller shades after finish work and ambient temperature, humidity and ventilation conditions are maintained at levels recommended for project upon completion.

1.07 WARRANTY

A. Hardware and Shade Fabric (standard windows): inpro® standard twenty-five year limited warranty.

B. Hardware and Shade Fabric: (observation tower curtain wall sloped glazing): Manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

Standard Windows:

1. Acceptable Manufacturer: inpro; Muskego, WI; Web: www.inpro.com.
2. Substitutions: See Section 01 6000 – Product Requirements.

2.02 MANUALLY OPERATED WINDOW SHADES (TYPICAL)

A. Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation:

1. H100 Pocket Clutch Shade® as manufactured by inpro.

Operation: Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Designed never to need adjustment or lubrication. Provide limit stops to prevent shade from being raised or lowered too far.

- a. Clutch mechanism: Fabricated from high carbon steel and molded fiberglass reinforced polyester or injected molded nylon. Black color as selected by Architect.
- b. Spring-assist bead chain clutch mechanism: Adjustment-free system includes spring-assist components to reduce lifting forces required to raise the shade. Manufacturer shall provide estimated torque for shade unit. Spring-assist is recommended on estimated non-spring-assist torque above 6 lb-in; required on shades with an estimated torque higher than 15 lb-in.

Bead chain loop: Stainless steel bead chain hanging at side of window.

- d. Idler Assembly: Provide roller idler assembly of molded nylon with adjustable or spring-loaded length idler pin to facilitate easy installation, and removal of shade for service.

Bead Chain Hold Down: P-Clip (standard).

Single Roller Configuration:

Mounting:

Ceiling/ jamb mounted.

Brackets: Plated stamped steel. Provide size compatible with roller size.

Mounted to ceiling/ jamb.

Finish: White.

Endcaps: Stamped steel with universal design suitable for mounting to ceiling, wall, and jamb. Provide size compatible with roller size.

Idler endcap to have optional levelling adjustment.

Endcap covers: Black.

Roller Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Minimum roller diameter 1.5 inches. Tube diameters less than 1.5" shall not be acceptable unless manufacturer provides deflection analysis showing deflection limited to $\leq \text{width(inches)}/700$ at 1.5X design load.

Fabric to tube attachments: LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.

2.03 FABRIC

Light-Filtering Fabrics

Vinyl Coated Polyester

2x2 basket weave- 245 black- WT 24x screen fabric with 5% openness.

Style:245 WT 24x, 5% openness

Color: To be selected by Architect from manufacturers standard range.

2.04 MANUALLY OPERATED WINDOW SHADES (OBSERVATION TOWER)

A. Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, 5 mil minimum thickness, anti-glare, scratch resistant, translucent plastic window shade with components necessary for complete installation.

1. 245 black-WT 24x screen fabric with 5% openness.

B. Provide with all hardware and accessories to provide a complete installation for the applications, locations, and sizes, identified on the drawings.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades.
- B. Coordinate requirements for blocking, and structural supports to ensure adequate means for installation of window shades.

INSTALLATION

- A. Install in accordance with manufacturer's instructions at all exterior openings, unless noted otherwise.
- B. Install roller shades level, plumb, square, and true. Allow proper clearances for window operation hardware.
- C. Install the following items to conceal roller and operating mechanism. Do not use exposed fasteners.

D. Position shades level, plumb, and at proper height relative to adjacent construction. Secure with fasteners recommended by manufacturer.

3.4 TESTING AND DEMONSTRATION

- A. Test window shades to verify that operating mechanism and other operating components are functional. Correct deficiencies.
 - 1. Chain and clutch.
 - 2. Demonstrate operation of shades to Owner's designated representatives.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 3200
PLASTIC LAMINATE CASEWORK

GENERAL

1.01 SECTION INCLUDES

- A. Manufactured plastic-laminate casework and accessories.

1.02 RELATED SECTIONS

- A. Section 06 1000 - Rough Carpentry
- B. Section 06 2000 - Finish Carpentry
- C. Section 10 9000 - Miscellaneous Specialties
- D. Section 22 4000 - Plumbing Fixtures: Sinks.

1.03 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI A161.2 - Decorative Laminate Countertops, Performance Standards For Fabricated High Pressure.
- B. Builders Hardware Manufacturers Association (BHMA): BHMA A156.9 - Cabinet Hardware.
- C. National Electrical Manufacturers Association (NEMA): NEMA 3 LD - High-Pressure Decorative Laminates.
- D. American Woodwork Institute (AWI): American Woodwork Standards (AWS).

1.04 DEFINITIONS

- A. Exposed: In casework, surfaces visible when drawers and opaque doors are closed; behind clear glass doors; bottoms of cabinets 42 inches or more above finished floor; and tops of cabinets less than 78 inches above finished floor.
- B. Semi-Exposed: In casework, surfaces that become visible when opaque doors are open or drawers are extended; bottoms of cabinets more than 30 inches or tops of cabinets less than 42 inches above finished floor.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01 3000 - Administrative Requirements.
- B. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- C. Shop Drawings: Submit shop drawings showing relationship with adjacent construction, including materials, construction finish, anchorage, and accessories. Submit drawings in accordance with manufacturer's requirements for lead time and approvals.
 - 1. Include manufacturer's catalog numbers and specifications.
 - 2. Finishes, hardware, construction options.
 - 3. Small scale floor plan showing casework in relation to the building.
 - 4. Large scale elevations and plan views.
 - 5. Cross-sections; service runs; locations of blocking within walls
 - 6. Rough-in requirements and sink centerlines.
 - 7. Illustrate products, installation, and relationship to adjacent construction.
- D. Verification Samples: Two representative units of each type, material, and color.
- E. Closeout Submittals: Operation and Maintenance Data.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications
 - 1. Manufacturer has a minimum of 10 years of experience of manufacturing architectural casework for similar projects, with a cataloged product line, and can show evidence of long-lasting financial stability.
 - 2. Certified for chain of custody by third party group approved by Forest Stewardship Council (FSC).
 - 3. Licensed under Architectural Woodwork Institute (AWI) Quality Certification Program (QCP).
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- D. Field Verification: Verify critical building dimensions prior to fabrication.

1.07 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work.
- B. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
- C. Review: Project conditions, manufacturer requirements, delivery, and storage, staging and sequencing, and protection of completed work

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
 - 1. Deliver casework once painting, and similar requirements have been completed that will not damage casework. This includes ensuring spaces are enclosed and weather tight.
 - 2. All casework shall be blanket wrapped or covered with cardboard and foam for protection during shipping.
- B. Protect from damage due to weather, excessive temperature, and construction operations.
 - 1. Casework must be protected from dust, dirt and/or other trades
 - 2. Countertops are stacked, properly supported and spaced evenly to avoid warping. Large pieces are stacked first on pallets with shorter pieces stacked on top.

1.09 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
- B. Do not deliver or install the casework until concrete, masonry, and drywall plaster work is dry; ambient relative humidity is maintained between 25 - 55 percent prior to delivery and throughout the life of installation; and the temperature is controlled above 55 degrees F.
- C. If ambient conditions are not met at the time of delivery, manufacturer reserves the right to void the warranty.

1.10 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty made out to the original Owner against defects in materials and workmanship. Non-casework items supplied, but not made by manufacturer; including but not limited to sinks, fixtures, apparatus, fume hoods, keyboard trays, lights, power outlets, and power strips shall be covered under the original manufacturer's warranty.

Warranty Period: For casework, 5 year warranty against defects in materials and workmanship, including non-casework accessories.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Case Systems, Inc., 2700 James Savage Rd.; Midland, MI 48642; www.casesystems.com

Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets: Custom Grade; Duty Level 3; all components unless noted otherwise.

Core Type: Plywood; Typical

- a. Veneer core plywood.
 - b. Face Screw Holding: 225 pounds minimum.
2. Core Type: Moisture resistant, MR/FSC. Typical at sink/wet locations.
- a. Interior-Grade moisture resistant plywood.
 - b. Meet or exceed M-3i Grade, according ANSI A208.1.
3. Core Type: All.
- a. ULEF/FSC (No added Urea Formaldehyde)
- C. Cabinet Joinery:
1. Concealed Interlocking Mechanical Fasteners or Dowel Construction: For cabinet body components. Manufacturers' discretion on best suited joinery method for project.
 2. Construction: Meets requirements in AWS Manual, Edition 2, including errata and appendix section.
- D. Surface Materials:
1. Vertical surface decorative grade; VGS.
 2. General purpose decorative grade; HGS.
 3. Cabinet decorative liner grade; CLS.
 4. Non-decorative backer grade; BKH.
 5. Thermally fused melamine laminate.
 6. Chemical resistant decorative laminate.
- E. Edge Banding: PVC, applied utilizing hot melt adhesive and radiused by automatic trimmer.
- F. Adhesives:
1. PVA: ULEF, zero VOC adhesive, mechanically applied.
 2. EVA: Adhesive, mechanically applied

2.03 FABRICATION

- A. General Cabinet Body Construction:

Cabinet Box Style: Flush inset fronts.

2. Cabinet Box Core: Veneer core plywood.
3. Structural Components: 3/4 inch thickness for bottoms and ends of cabinets, and tops of tall cabinets and tops and bottoms of wall cabinets.
4. Fixed Interior Components: 3/4 inch thick for fixed shelves and dividers; attached with concealed interlocking mechanical fasteners.

Cabinet Body Exterior Surfaces: VGS; standard.

Cabinet Interior Finish: Finished.

Cabinet Body Interior Surfaces: Thermally fused; standard.

Cabinet Body Front Edge: 0.020 inches PVC; standard

9. Cabinet Body Mounting: Stretchers are 3/4 inch thick structural components fastened to end panels and back by mechanical fasteners, and are concealed by the cabinet back.

Exposed Laminate Back Panels: A separate, finished 3/4 inch thick back panel when the rear of a cabinet is exposed, plastic laminate to match other exposed surfaces.

11. Hole Pattern: 3/16 inch diameter row hole pattern 1-1/4 inches on center bored in cabinet ends for adjustable shelves, for hardware mounting and replacement and relocation of cabinet components.

Base Cabinet Construction:

1. Height: As indicated on the drawings.
2. Adjustable Shelf Loading: 50 lbs. per sq. ft.
3. Cabinet Doors and Drawer Fronts: Flush style, plastic laminate all sides, PVC edge banding.
4. Base Cabinet Sub-Top: Solid 3/4 inch thick sub-top of core for base cabinets, except sink cabinets; fastened between the ends with interlocking mechanical fasteners.

Split Removable Back Panels for sink cabinets:

- a. Front Braces: Formed metal, powder coated black.
- b. Steel Corner Gussets: At corners.

Tall Cabinet Construction:

1. Intermediate Shelves: Fixed
2. Intermediate Stretchers: Located behind the back panel.
 - a. Thickness: 3/4 inch.
 - b. Secured between cabinet ends with mechanical fasteners.
 - c. Secured to the shelf through the back with No. 8 x 2 inches plated flat head screws.

Wall Cabinet Construction:

1. Lower Stretchers: Located behind the back panel.
 - a. Thickness: 3/4 inch.
 - b. Attached between the end panels with mechanical fasteners.
 - c. Secured through the back and into the cabinet bottom.
 - d. Wall cabinets over 36 inches in width receive a fixed intermediate partition.

Exterior Bottoms: Match exterior surface.

Tall and Wall Cabinets Top Edges:

Edges: 0.020 inch PVC at top of end panels, stretchers and back.

Tall, Wall and Hutch Cabinets Exterior Top Finish:

Top Materials: HPL to match exterior surface.

Base, Tall, Wall and Hutch Upper Door Reveals:

Reveal between Doors and Drawers: 3mm.

Cabinet Toe Bases:

1. Construction:
 - a. Bases support and carry the load of the end panels, and the cabinet bottom, directly to the floor.
 - b. Bases are let in from the sides and back of the cabinet to allow cabinets to be installed tightly together and tight against a wall, and to conceal the top edge of applied vinyl base molding.
 - c. Center Support: Front to back center support for bases over 30 inches wide.

Individual Bases, Materials: Veneer core plywood.

Toe Bases, Height: 4" nominal, or otherwise as indicated on the drawings.

Toe Base Type: Attached; standard.

5. Finish: Plastic laminate

Drawer Fronts and Solid Doors: Surfaced on both sides.

Core Materials: Veneer core plywood.

Core Thickness: Standard.

Component Materials: HPL door and drawer front exterior and grade CLS on interior.

Surfaces: HPL grade VGS; standard.

Doors: Standard.

Door and Drawer Front Edges: 1/8 inch PVC; standard.

Drawer Boxes:

Core Materials: Veneer core plywood.

2. Construction: Non-racking, non-deflecting platform bottom that is carried directly by L shaped, bottom mount drawer glides.

Drawer Boxes with Finished Interiors: Surface to match standard interior; standard white.

4. Slides: Secured with 1-1/4 inches long screws driven through the platform and into the sides.

5. Drawer Box Sides, Backs, Sub-fronts, and Bottoms: 1/2 inch thick.

6. Top Edges: Nominal 1 mm PVC, matching the drawer color.

7. Drawer Box Corners: Joined with fluted hardwood dowels and glue spaced at a minimum of (1-1/4 inches) on center.

8. Drawer Box Fronts: Removable and attached to drawer box sub-front with screws from inside of drawer.

9. Horizontal Parting Rails Between Drawers: 3/4 inch thick core, with balanced surfaces, secured to and further reinforcing cabinet ends.

File Drawer Box Construction: Full-height sides supporting a heavy-duty support rail for hanging file folders.

Cabinet Doors:

Construction: Solid doors, 3/4 inch thick core; standard.

L. Shelves:

1. Adjustable Shelves:

Exposed to View: Plastic laminate, all sides, to match doors/drawers.

Not Exposed to View: Thermally fused, all sides

Core Materials: Veneer core plywood.

Thickness of Adjustable Shelves in Closed Cabinets:

1) For Shelves Under 36 Inches Wide: Standard, 3/4 inch thick.

2) For Shelves Over 36 Inches Wide: 1 inch thick.

Adjustable Shelf Edges on Closed Cabinets: 0.020 inch match edge at front; standard.

Adjustable Shelf Surfaces on Closed Cabinets: Match interior; standard.

Setback for Adjustable Shelves: 19/32 inch from the front; standard.

f. Setback for Adjustable Shelves: 29/32 inch setback option when locks are used.

2. Fixed Shelves:

Exposed to View: Plastic laminate, all sides, to match doors/drawers.

Not Exposed to View: Thermally fused, all sides

Core Materials: Veneer core plywood.

Thickness of Fixed Shelves:

1) For Shelves Under 36 Inches Wide: 3/4 inch thick.

2) For Shelves Over 36 Inches Wide: 1 inch thick.

Fixed Shelf Surfaces on Closed Cabinets: Match interior; standard white.

Fixed Shelf Surfaces on Open Cabinets: Finished on both sides with plastic laminate to match doors/drawers.

Wall Shelves:

Exposed to View: Plastic laminate, all sides, to match doors/drawers.

Not Exposed to View: Thermally fused, all sides

Core Materials: Veneer core plywood.

Wall Shelf Surfaces: Thermally fused.

2.04 COUNTERTOPS

- A. See Section 12 3600 - Countertops

2.05 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Fasteners: Size and type to suit application.
- C. Grommets: Standard 2" O.D. plastic grommets for cut-outs, in color to match adjacent surface or as otherwise selected by Architect from manufacturers standard range.
- D. Silencers/Cabinet Bumpers: Standard clear plastic, locate at all corners of doors and drawers.

2.06 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards with 1" spacing adjustments and coordinated self-rests, polished chrome finish.
 - 1. Standard: Knape & Vogt #255.
 - 2. Shelf Rest: Knape & Vogt #256.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- C. Drawer and Door Pulls: ADA "U" shaped wire pull, aluminum with satin finish, 4-inch centers.
- D. Drawer Slides:
 - 1. Type: Full extension.
 - 2. Static Load Capacity: Commercial grade; 150 pounds minimum.
 - 3. Mounting: Side mounted.
 - 4. Stops: Integral type.
 - 5. Features: Provide self-closing/stay closed type.
- E. Drawer Systems: Integrated drawer slide and side.
 - 1. Side Type: Single Wall.
 - 2. Drawer Side Height: 4-5/8 inches.
 - 3. Drawer Length: 18 inch.
 - 4. Mounting: Side mounted.
 - 5. Stops: Integral type.
 - 6. Features: Provide self-closing/stay closed and white epoxy finish type.
- F. Hinges: European style concealed self-closing type, steel with polished finish.
 - 1. Manufacturers:
 - a. Grass America Inc.; Institutional Hinges: www.grassusa.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- G. Countertop Supports: See Section 06 2000 – Finish Carpentry

2.07 FINISHES

- A. Plastic Laminate Casework Colors:

High Pressure Laminate:

Finish: Typical, unless noted otherwise.

- b. Basis of Design

PL-1: Formica; Natural Grain Texture (vertical), Graphite Elm 5796-NG:

www.formica.com.

PL-2: Formica; Satintouch (11), Ferro Grafite 9483: www.formica.com

- 2. Thermally Fused Melamine Laminate:

- a. Compliance: Meets performance requirements of ANSI/NEMA 3 LD for GP-28.

Finish: Frosty White - Tango 1573.

3. Cabinet Liners: High-pressure cabinet liners.
 - a. Thickness: 0.020 inch
 - b. Compliance: Conforming to ANSI/NEMA 3 LD, Grade CLS.
 - c. Texture: None

Color: Frosty White - Tango 1573.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. Verify blocking and concealed supports are in place.
- C. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean substrates thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated; ANSI/AWI 0641, AWI 0620.
- B. Install in accordance with manufacturer's instructions, approved submittals and in proper relationship with adjacent construction.
 1. Anchor to wall blocking, not to plaster lath or wallboard.
 2. Test components for proper operation and adjust until satisfactory results are obtained.
- C. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- D. Use fixture attachments in concealed locations for wall mounted components.
- E. Use concealed joint fasteners to align and secure adjoining cabinet units.
- F. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- G. Seal all cut edges prone to moisture, i.e. sink cutouts, with sealant per AWI Standards prior to sink installation.

3.04 CLEANING AND PROTECTION

- A. Clean products in accordance with the manufacturer's recommendations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 3600
COUNTERTOPS, WINDOW STOOLS & WALL CAPS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Countertops for manufactured casework.
- B. Wall-hung countertops.

1.02 RELATED REQUIREMENTS

- A. Section 06 4100 - Architectural Wood Casework.
- B. Section 10 9000 - Miscellaneous Specialties
- C. Section 22 4000 - Plumbing Fixtures: Sinks.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard.
- B. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications.
- C. AWI (QCP) - Quality Certification Program.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition.
- E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.
- F. ISFA 2-01 - Classification and Standards for Solid Surfacing Material.
- G. NEMA LD 3 - High-Pressure Decorative Laminates.
- H. PS 1 - Structural Plywood.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Installation Instructions: Manufacturer's installation instructions and recommendations.
- F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS

- A. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
 - 1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048-inch nominal thickness.
 - a. Manufacturers:
 - 1) Formica Corporation: www.formica.com.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
 - b. Finish: Satin Touch Texture
 - c. Surface Color and Pattern: 180 fx, Antique Mascarello 3466-11
 - 2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
 - 3. Back and End Splashes: Same material, same construction..

2.02 MATERIALS

- A. Plywood for Supporting Substrate: PS 1 (Exterior Grade at sinks), A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- C. Joint Sealant: Mildew-resistant silicone sealant, clear.

2.03 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of tops using best method recommended by manufacturer.
 - 2. Fabricate to overhang fronts and ends of cabinets 1/2 inch except where top butts against cabinet or wall.
 - 3. Where indicated, waterfall edges to have mitered joint.
 - 4. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 - 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 - 2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. See Section 10 9000 – Miscellaneous Specialties for countertop brackets to attach the Hand Washing counter with sinks.
- C. Seal joint between back/end splashes, vertical surfaces, window stools, and the perimeter of all penetrations, including sinks.

3.04 TOLERANCES

- A. Variation from horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset from wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field joints: 1/8 inch wide, maximum.

3.05 CLEANING

- A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION